

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during August, 1884, based upon the reports from the regular and voluntary observers of the Signal Service and co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic ocean during the month are also given and their approximate paths shown on chart i.

The following may be mentioned as the most noteworthy meteorological features of the month:

1st. The low mean temperatures which prevailed over the greater part of the country, the departures being greatest in the northern plateau and north Pacific coast region, and from Colorado and Wyoming eastward to the Mississippi river.

2d. The frosts which occurred in the upper lake region on the 9th; and in New England and the middle Atlantic states on the 25th, those occurring on the last mentioned date being destructive to vegetation.

3d. The excessive precipitation over the eastern Rocky mountain districts, upper Missouri valley, and extreme northwest; and the unusually small precipitation in the central valleys and Gulf states, where severe drought prevailed.

4th. The moderate weather which prevailed generally over the north Atlantic ocean, the depressions traced on chart i. being of slight energy. It is worthy of note that no tropical hurricane passed near the coasts of the United States during this month.

On the afternoon of the 10th an earthquake shock was felt along the Atlantic coast, and to a considerable distance inland, from Maryland and Delaware northward to Massachusetts and southern Vermont.

With this number of the REVIEW are published two additional charts, numbers iv. and v. The former shows the regions over which frosts occurred on the 9th and 25th, with the isotherms showing the minimum temperatures for the same dates; and the latter shows the departures from the normal atmospheric pressure and temperature.

On pages 197 and 206 will be found tables containing miscellaneous meteorological data from the regular and voluntary observers of the Signal Service.

In the preparation of this REVIEW the following data, received up to September 20th, 1884, have been used, viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-two Signal Service stations and eighteen Canadian stations, as telegraphed to this office; one hundred and fifty-eight monthly means from the former, and eighteen monthly means from the latter; two hundred and sixty-five monthly registers from vol-

untary observers; forty-five monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Alabama, Georgia, Indiana, Louisiana, Missouri, Nebraska, Ohio, and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[Expressed in inches and hundredths.]

The mean atmospheric pressure for August, 1884, determined from the tri-daily telegraphic observations of the Signal Service, is exhibited by the isobarometric lines on chart ii. As in the previous months (since May) the area of least pressure includes the middle and southern plateau districts, where the monthly barometric means are slightly below 29.85. From the region above named the pressure increases to 30.0 on the north Pacific coast, and to 30.05 over an area extending from the lower Mississippi valley northeastward to Nova Scotia.

Compared with the mean pressure for July, 1884, a slight decrease is shown on the Pacific coast, the deficiency amounting less than .05, except at Portland, Oregon, where it is .07. Eastward of a line extending from Idaho southward to Arizona, except in southern Florida, the mean pressure is greater than for the preceding month. From the Rocky mountains eastward to the ninety-fifth meridian; and in the Gulf states the increase varies from .01 to .10. From the lower Missouri and lower Arkansas valleys northeastward to Nova Scotia, the increase varies from .10 to .25, being greatest over the last-named region, and in New England. It is worthy of remark that the marked increase of pressure over this region as compared with last month corresponds to a decided decrease of pressure in the same region for July as compared with that for June.

The mean pressure for August, 1884, compared with the normal (see chart v.) shows a deficiency ranging from .01 to .06 over the northern districts from the lower lakes westward to Montana. A slight deficiency also occurs in the north Pacific coast region, in the southern plateau, and in southern California; in all other districts the mean pressure is normal or slightly above.

BAROMETRIC RANGES.

The barometric ranges were greatest in the lake region and extreme northwest, where they exceeded .75; they were least in Arizona, southern California, along the west Gulf coast, and in southern Florida, where they were less than .25. The smallest monthly range, .22, occurred at Fort Grant, Arizona; and the greatest, .82, occurred at Alpena, Michigan.

In the several districts the monthly ranges varied as follows: *New England*.—From .48 on the summit of Mount Washington, New Hampshire, and .52 at Eastport, Maine, to .63 at Boston, Massachusetts.

Middle Atlantic states.—From .52 at Lynchburg and Norfolk, Virginia, to .68 at Albany, New York.

South Atlantic states.—From .34 at Jacksonville, Florida, to .55 at Kitty Hawk, North Carolina.

Florida peninsula.—From .24 at Key West to .34 at Cedar Keys.

East Gulf states.—From .31 at New Orleans, Louisiana, to .37 at Montgomery, Alabama.

West Gulf states.—From .25 at Galveston and Indianola, Texas, to .41 at Little Rock, Arkansas.

Rio Grande valley.—From .21 at Brownsville, Texas, to .25 at Rio Grande City, Texas.

Tennessee.—From .38 at Chattanooga and Knoxville, to .45 at Nashville.

Ohio valley.—From .56 at Louisville, Kentucky, to .59 at Cincinnati, Ohio.

Lower lake region.—From .61 at Cleveland, Ohio, to .76 at Rochester and Oswego, New York.

Upper lake region.—From .68 at Chicago, Illinois, to .82 at Alpena, Michigan.

Extreme northwest.—From .61 at Fort Buford, Dakota, to .75 at Moorhead, Minnesota.

Upper Mississippi valley.—From .48 at Cairo, Illinois, to .69 at La Crosse, Wisconsin.

Missouri valley.—From .62 at Leavenworth, Kansas, to .74 at Huron, Dakota.

Northern slope.—From .44 at Helena, Montana, to .61 at North Platte, Nebraska.

Middle slope.—From .45 on the summit of Pike's Peak, Colorado, to .56 at West Las Animas, Colorado.

Southern slope.—From .27 at Fort Stockton, Texas, to .42 at Fort Sill, Indian Territory.

Southern plateau.—From .22 at Fort Grant, Arizona, to .36 at El Paso, Texas.

Middle plateau.—47 at Salt Lake City, Utah.

Northern plateau.—From .42 at Dayton, Washington Territory, to .54 at Lewiston, Idaho.

North Pacific coast region.—From .42 at Fort Canby, Washington, Territory, to .44 at Portland, Oregon, and Olympia, Washington Territory.

Middle Pacific coast region.—From .30 at San Francisco, California, to .41 at Red Bluff, California.

South Pacific coast region.—24 at Los Angeles and San Diego, California.

AREAS OF HIGH BAROMETER.

Only four areas of barometric maxima have been of sufficient importance to merit description, and of these, two only, numbers ii. and iii., caused marked changes in the weather conditions. Frosts occurred in Michigan and northern Ohio and Indiana during the passage of the former, and during the prevalence of the last-mentioned area, they occurred in the New England states and as far south as New Jersey. The high areas moved from the northwest to the central valleys and then eastward or northeastward to the Atlantic.

I.—The midnight chart of the 1st showed a barometric rise in Montana which continued about stationary above the normal until the morning of the 2d. On the afternoon of the 2d it had extended its influence southerly, continuing central in northern Montana, with barometric readings .20 above the normal, which departure continued with a southeasterly movement, and, on the afternoon of the 4th, it was central near Omaha, Nebraska. The area of departure of .20 from the normal had contracted and by the midnight report a uniform area, about .10 above the normal, spread from Missouri to Texas and northward to Dakota. Henceforward no distinct area of departure was observed, and nearly normal pressure existed, with light variable winds from Texas to the middle Atlantic states. The movement of this high area lowered the temperatures below the normal in the central valleys and the northwest. Local rains were abundant in all the districts, and temperatures below the normal accompanied the barometric area.

II.—This area was first observed on the morning of the 7th, in Manitoba, where the departure from the normal amounted

to .20; the next morning it was central over Wisconsin. The temperatures accompanying the area were quite low for the season, frosts being reported in Michigan on the morning of the 8th. By the morning of the 9th, the high area overlaid the lake districts, the Saint Lawrence valley, and the states of Wisconsin, Illinois, and Iowa. Frosts were again reported in Michigan and on the northern Ohio and Indiana boundary. By the morning of the 10th, the high area had spread over New England and continued highest over the states of Illinois, Missouri, and Iowa. The temperatures accompanying this area were about 10° below the normal. By the morning of the 11th the pressure had diminished and was only slightly above the normal over the state of Missouri. Henceforth it deserves no mention, except that its eastern portion developed over the New England states and Canadian maritime provinces on the 12th, and, with the occurrence of a slight depression on the coast, noticed on the morning of the 13th, caused high northeasterly winds from North Carolina northward, and, by the 14th had moved into the Atlantic, but was immediately followed by a pressure above the normal from the Gulf to Canada. This high area continued hovering on the Atlantic and Gulf coasts till the 21st. After the 15th the winds, becoming southerly in the western portion of the high area, raised the temperatures above the normal which, for the first half of the month, had been generally below the normal.

III.—This high area appeared in northern Montana on the 22d, at the morning report of that date the barometer ranging from 30.1 to 30.16, or about .20 above the normal. At midnight of the 22d, the area extended, as a ridge of high pressure, from the Northwest Territories and Manitoba southward to Nebraska, and the temperature fell about 10° at stations in the extreme northwest and the Missouri valley. The high area moved southeastward and at the morning report of the 23d its centre was in Iowa, the barometer at Des Moines reading 30.2. The area continued its southerly movement until midnight of the 23d, when the centre was in Missouri; by the morning of the 24th the high area covered the Mississippi valley, the lake region, Tennessee and the Ohio valley, and the northern part of the west Gulf states, the region of greatest pressure being in the upper lake district, where the barometer read 30.2. In the districts named above the pressure ranged from .10 to .20 above the normal, except in Tennessee and the northern part of the west Gulf states, where the excess varied from .02 to .09; the temperature fell about 10° at stations in the northern part of the lake region, and about 5° elsewhere, with fair or clear weather in all districts. During the 24th the area moved east-southeastward, attended by increasing pressure and cool, clear weather; at the midnight report of that date the highest readings were observed at stations in Ontario and New York, where they varied from 30.21 at Saugeen, Ontario, to 30.30 at Albany, New York, or .22 and .26 above the normal respectively. Throughout the lower lake region, the northern half of the middle Atlantic states and the New England states, except Maine, the pressure exceeded 30.2. By the morning of the 25th, the isobar for 30.3 occupied eastern Pennsylvania, parts of Delaware and Maryland, New Jersey, and all the New England states except Maine; and during the night of the 24-25th, frosts occurred as far south as northern New Jersey and northeastern Pennsylvania. During the day the high area passed into the Atlantic and when last observed, on the morning of the 26th, it was near Nova Scotia and Cape Breton Island, where the barometer at Sidney read 30.35, or .37 above the normal. The minimum temperatures of the month in New England, the northern part of the middle states and at stations on Lake Ontario were associated with the passage of this high area, and more or less damaging frosts, which are fully enumerated under the head of "Frost," occurred in connection therewith.

IV.—This area appeared on the Pacific coast and at no time during its passage was it well defined. The morning report of the 28th, showed the pressure on the Pacific coast to be about

.10 above the normal; this condition prevailed during the day, the increase gradually spreading eastward. By the morning of the 29th, the area of highest pressure occupied Montana and Idaho, where the barometric readings varied from 30.12 to 30.24, or about .20 above normal. The pressure increased slowly during the day in a southerly and southeasterly direction, and by the 30th the barometer was highest in Kansas, where it read 30.11. During the day the pressure decreased until it reached the normal condition and the high area disappeared without exhibiting any marked meteorological features.

AREAS OF LOW BAROMETER.

On referring to chart i. it will be seen that the greater part of the low areas traced during the month have moved eastward at comparatively high latitudes (north of N. 48°), skirting only the northern boundary of the United States, with the exception of low areas x. and xi., which developed in Ohio and in Michigan on the 28th and 29th. No storm-centres are traced in the eastern half of the United States south of the Saint Lawrence valley or the lake region. In addition to the two distinct storm-centres traced in the western part of the United States, an extensive area of low pressures has remained in the plateau regions throughout the entire month. The general direction of movement of the low areas was south of east until reaching the Lake Superior region, and thence east or north of east to the Saint Lawrence valley. Only slight storm energy was exhibited during the passage of the centres.

The following table gives the latitude and longitude in which each area was first and last observed, and the average hourly velocity:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
No. I.....	50 00	109 00	47 00	75 00	21.8
II.....	48 00	90 00	47 00	78 00	29.2
III.....	52 00	105 00	52 00	95 00	28.0
IV.....	45 00	109 00	48 00	97 00	18.8
V.....	49 00	69 00	49 00	63 00	32.5
VI.....	38 00	103 00	51 00	64 00	40.2
VII.....	49 00	100 00	51 00	62 00	35.7
VIII.....	52 00	113 00	50 00	60 00	33.8
IX.....	50 00	100 00	47 00	74 00	30.0
X.....	41 00	84 00	47 00	74 00	22.0
XI.....	44 00	84 00	50 00	67 00	29.0
Mean hourly velocity.....					30.7

* Centres united in about N. 46°, W. 76°. The average hourly velocity of low centres for August, as determined for 1876 and 1884, inclusive, is 24.4 miles.

I.—At the morning report of the 1st the pressure over Montana and Dakota was from .20 to .40 below the normal, the centre of disturbance being in British America, north of Montana, where the barometer at Medicine Hat read 29.48. Signals were ordered at Duluth in the morning, and in the afternoon on Lakes Michigan, Superior and Huron, as far as Alpena. The area moved in an east-southeasterly direction with slight change of pressure at the centre, and on the morning of the 2d it reached Minnesota, the barometer at Saint Vincent reading 29.52, or .40 below the normal. Cloudy weather, local storms, and thunder storms occurred in Minnesota, Dakota, Wisconsin, and Iowa, and heavy rain was reported from stations lying north of the centre, and a tornado occurred in Wisconsin. On the 3d the depression passed over Lake Superior, causing cloudy or rainy weather in the Mississippi and Ohio valleys and in the lake region; in those districts the pressure was from .10 to .30 below the normal, with temperature slightly above normal. Cautionary signals were ordered at all stations on Lake Huron in the morning of this date, and at stations on Lakes Erie and Ontario in the afternoon. On the morning of the 4th the disturbance, having passed eastward over Ontario, was central in the province of Quebec, the lowest reported pressure being 29.66 at Rockliffe, Ontario; during the 4th the depression disappeared with rising pressure. Brisk to high winds occurred at stations in the lower lake region during the passage

of this disturbance. All signals were lowered at the morning report of the 4th, with justification velocities on the upper lakes.

II.—This area appeared north of Lake Superior at midnight of the 5th, when the barometer at Prince Arthur's Landing read 29.64; it moved southeastward, attended by rainy weather at stations in the vicinity of the centre, and brisk to high winds at stations in Minnesota, Wisconsin, and Michigan. Cautionary signals were displayed on the morning of the 6th at Escanaba, the Lake Superior stations, and the Straits of Mackinaw; the signals were late at Duluth, and a gale occurred at Milwaukee without signals. At the afternoon report of the 6th the signals were lowered. By the morning of the 7th the depression had passed into Canada, where it apparently filled up. On the 7th gales occurred on the middle Atlantic coast, for which signals were ordered, in the afternoon, from Point Judith to Fort Macon, but were late from the capes of Delaware to the capes of Virginia. A gale also occurred at Sandusky, Ohio. On the morning of the 8th, signals were lowered, having been justified by velocities of at least twenty-five miles, as far south as Kitty Hawk.

III.—This disturbance, which was at no time within the limits of the United States, appeared in the Saskatchewan valley on the afternoon of the 11th; it moved eastward, causing a slight decrease of pressure at stations on the northern boundary of the United States, and disappeared beyond the field of observation on the 12th.

IV.—This depression appeared in southern Montana on the morning of the 14th, the pressure near the centre being below 29.80, or about .10 below the normal. At the afternoon report of the same day, the region of least pressure remained in Montana, and the area of decreasing pressure had extended to the northward and eastward. At the midnight report the lowest barometer reading was observed at Qu' Appelle, 29.59; at northern stations in Montana and Dakota the pressure was .20 below the normal. During the 15th the disturbance passed southeastward to Minnesota where it dissipated. Light showers occurred at stations in Montana and Dakota, and thunder-storms were reported from the region north of those territories during the passage of this area. The maximum temperatures of the month in Montana and Dakota also occurred in connection therewith.

V.—This was a slight disturbance which appeared north of Father Point, Quebec, at the midnight report of the 17th, when the barometer at that station read 29.77 or .15 below the normal. On the 18th the low area moved to the Gulf of Saint Lawrence.

VI.—This disturbance developed in Colorado during the 18th, and by the afternoon report of the 19th the atmospheric depression had extended northward and eastward over Nebraska and Kansas, although the minimum pressure, 29.50, was reported from West Las Animas, Colorado, where the barometer stood .30 below the normal. At the midnight report of the 19th the centre of disturbance was in Dakota, the barometer at Huron reading 29.50, or .44 below the normal, and at Moorhead, Minnesota, it read 29.52, or .42 below the normal. Gales occurred on Lake Michigan on the 19th, and signals were ordered at the midnight report on Lake Superior and northern ports of Lake Michigan. During the 20th the depression moved north-northeastward over Minnesota, accompanied by cloudy weather and light rains in that state, and at stations in the Mississippi valley and the upper lake region; brisk to high southwest winds occurred in the last-mentioned districts, with a gale at Milwaukee, but signals were not justified except at Duluth, during the passage of the disturbance. On the morning of the 21st the disturbance appeared as an extended depression central north of the lake region, the pressure in that district and along the Saint Lawrence valley being from .10 to .20 below the normal. When last observed at midnight of the 21st the depression was apparently over the Gulf of Saint Lawrence, the lowest recorded barometer being 29.69 at Father Point, Quebec, and 29.67 at Anticosti, or about .23

below the normal; brisk to high southwest winds were reported at Sidney, Cape Breton Island, and at Bird Rock. The maximum temperatures of the month, in the Mississippi valley and at stations in the northern part of the upper lake region, occurred in connection with the passage of this area.

VII.—This was a slight disturbance which appeared in Manitoba on the 22d; it moved east-southeastward during the day, and at the morning report of the 23d, the lowest recorded barometer readings were 29.81 at Mackinaw City, Michigan, and 29.83 at Parry Sound, Ontario, these values being .22 and .20 below the normal, respectively. By the afternoon report of the 23d, the pressure had decreased to 29.70 at Rockliffe, Ontario, and high winds to gales occurred in the lower lake region, with light to heavy rains at the northern stations. The disturbance moved down the Saint Lawrence valley, and as the winds shifted to northwest and west in the lower lake region, they attained a velocity ranging from twenty-five to thirty-three miles an hour at stations on Lakes Huron, Erie, and Ontario. On the morning of the 24th the disturbance reached the mouth of the Saint Lawrence, and passed over the Gulf.

VIII.—The afternoon reports of the 23d showed a considerable decrease of pressure in the region north of Montana; at the midnight report the barometer at Medicine Hat read 29.37, while the pressure in northern Montana and northwestern Dakota was more than .20 below the normal. On the morning of the 24th the lowest barometer readings were reported from northern Dakota and the Saskatchewan valley, where the pressure was 29.52 to 29.62, or about .30 below the normal. The low area moved eastward north of the United States, and on the 25th it occupied the Lake Superior region; it then moved in a course slightly south of east over the northern part of the lake region, giving rainy weather in both the upper and lower lake regions, with high south and southwest winds to gales in the former and brisk to high winds in the latter district. The pressure increased as the disturbance moved along the Saint Lawrence valley during the 26th causing showery weather in that district. By the morning of the 27th the depression had passed to the northward of Anticosti Island.

IX.—This area appeared in the Saskatchewan valley on the 28th, with a subsidiary depression in Minnesota. During the day the principal depression moved east-southeastward, and was over Lake Superior on the morning of the 29th, the pressure at Duluth, Minnesota, being 29.60, or .42 below normal; at the afternoon report the centre of this depression was in western Ontario, while another disturbance, which had moved up from the Ohio valley, was central over Lake Huron. During the day the two disturbances probably united and, together with low area xi., passed as an extensive depression along the Saint Lawrence valley at the close of the month.

X.—This disturbance apparently developed in the Ohio valley on the 28th; at the afternoon report of that date the barometer at Columbus, Ohio, had fallen to 29.70, or .30 below normal, and light rain had been falling at stations in the Ohio valley and in the southern part of the lower lake region since the morning report. At midnight the minimum pressure was reported from Port Huron, where the barometer read 29.59, or .41 below the normal; rainy weather continued at the lake stations, and at Buffalo the wind reached a velocity of twenty-six miles an hour from southeast. On the morning of the 29th the storm-centre was near Toronto, Ontario; at that station the barometer read 29.55, or .48 below normal; rain continued to fall at stations near the centre, and cloudy weather with occasional rains prevailed in the middle Atlantic states. At the afternoon report of the 29th the depression still occupied Ontario, the pressure at stations in that province ranging from 29.54 to 29.60. Brisk to high southwest winds occurred at stations on Lake Ontario, and the rain area extended to New England. At midnight the disturbance was passing northeastward over the Saint Lawrence valley, causing rainy weather in that district, while a secondary depression had

appeared over Lake Huron. Severe local storms occurred in Illinois, Indiana, and northern Kentucky during the passage of this disturbance.

XI.—This disturbance, which was probably a secondary development of low areas ix. and x., appeared over Lake Huron, at midnight of the 29th; at that report the barometer at Port Huron read 29.59, or .41 below the normal. On the morning of the 30th, the storm-centre was apparently over the northern part of the lake, the minimum pressures being 29.53 at Alpena, Michigan, and 29.55 at Saugeen, Ontario, or about .45 below the normal. At the afternoon report of the 30th, the barometer at Rockliffe, Ontario, read 29.46, or .49 below normal; high westerly winds to gales prevailed at stations on Lakes Huron, Erie, and Ontario, with rainy weather at the northern stations. During the 31st the disturbance moved northeastward causing light rains in New England and along the Saint Lawrence valley, and followed by clearing weather in the lake region.

NORTH ATLANTIC STORMS DURING AUGUST, 1884.

[Pressure expressed in inches and in millimetres; wind-force by scale of 0—10

The paths of the atmospheric depressions that have appeared in the north Atlantic ocean during the month have been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels, and from other miscellaneous data received at this office up to September 20, 1884.

The observations used are in general simultaneous, being taken each day at 7 a. m. Washington, or 12h. 8m. p. m. Greenwich, mean time.

The month of August has been marked by an absence of severe storms; at the present writing no reports of vessels having encountered tropical or sub-tropical hurricanes during this month have been received at this office.

The paths of ten depressions are shown on the chart; of these, only one (number 10) has been traced as a continuation of a disturbance which first passed over the North American continent. The remaining depressions, which were ill-defined and unimportant, appear to have developed, for the most part, to the northeastward of the banks of Newfoundland, and have moved northeastward, manifesting little or no storm-energy during their passage.

The disturbances which reached the Gulf of Saint Lawrence from the westward have apparently moved northward beyond the region covered by the reports. This movement appears extremely probable in view of the fact that the depressions which passed over the continent moved to the northward of the usual tracks for August.

The weather over the north Atlantic ocean during the month may be summarized as follows: 1st to 18th, moderate to strong westerly breezes, attaining occasionally the force of a moderate gale; frequent fogs to the westward of W. 45°, weather variable. From the 18th to the close of the month, fresh to strong breezes with occasional gales, winds mostly from sw. to nw. and n.; generally cloudy or rainy weather. In connection with the subject of fog, Captain G. de Kersabiec, commanding the s. s. "Canada," (General Trans-Atlantic Co.), reports as follows: "We had much fog from longitude 35° west of Greenwich to longitude 53° W; sea generally high from Havre to the Banks."

The following are brief descriptions of the depressions charted:

1.—This is a continuation of the depression traced over the Atlantic as number 5 on the chart for July. At the close of that month the disturbance was central near N. 50°, W. 30°, and by August 1st, it had reached N. 51°, W. 20°, the pressure near the centre being below 29.6 (751.8); moderate to fresh nw. gales were reported by vessels on the fiftieth parallel and the westward of 20° W. During the day the depression moved northeastward near the British coasts, causing strong southerly winds and rain over the western districts of the British Isles.

2.—On the morning of the 4th the report of the barkentine "Corisande," D. Thoms, commanding, indicated the presence of a depression near N. 55°, W. 30°. In N. 54° 32', W. 30° 52', the barometer read 29.43 (747.5), being a fall of .44 inch, while the wind shifted from ssw. to n., with rainy, cloudy weather; the wind did not exceed the force of a fresh breeze. On the 5th, the s. s. "State of Georgia," G. Moodie, commanding, reported in N. 54° 3', W. 23° 11', barometer 29.57 (751.1) a decrease of .38 inch since the observation of the 4th; wind ssw., force 5, showery. By the following day the depression had passed beyond the range of the observations.

3.—This depression appeared near N. 53°, W. 25° on the 8th; the reports of the steamships "City of Richmond," "Lessing," "Leerdam," and "British Princess," all between N. 49° and 53°, and W. 20° and 30°, showed a decrease of pressure averaging .25 inch, with cloudy, rainy weather and light to fresh breezes from sse. to nw. On the 9th the region of least pressure was shown near N. 52°, W. 18°, where the barometer ranged from 29.66 (753.4) to 28.8 (756.9), with s. and sw. winds, ranging from the force of a moderate breeze to that of a moderate gale. The disturbance apparently moved northeastward, causing a slight decrease of pressure in the western districts of the British Isles, and on the 10th it was central to the north-westward of Ireland, the pressure having risen to 29.8 (756.9).

4.—This disturbance developed between W. 45° and 35° during the 9th; Captain Thoms, commanding the barkentine "Corisande," near N. 57°, W. 45°, reported: "9th, 9 p. m. Greenwich time, wind sw. suddenly increasing to force 8 and veering to w., with drizzling rain; lowest reading of the barometer 29.54 (750.3). At 1 a. m. of the 10th, the wind suddenly shifted to nw., and slightly increased in force, continuing to blow for about two hours, when the barometer began to rise; the wind gradually abated, and the weather cleared up in N. 51° 37', W. 46° 40'." The s. s. "Venetian," W. H. Trant, commanding, reported: "10th, in N. 49° 35', W. 30° 45', barometer 29.46 (748.3), wind s. by w., force 6, shifting to w. at 1 p. m., and blowing strongly, with confused sea till 11 p. m., when a heavy northerly swell set in, causing the ship to roll heavily." Captain Müller, commanding the bark "Johanne," in about N. 48° 30', W. 25°, reported as follows: "10th, 4 p. m., wind increasing from s. by w.; 6 p. m., blowing a whole gale, with drizzling rain, heavy sea, barometer 29.72 (754.9); 10 p. m., barometer 29.6 (751.8), wind still s. by w., blowing hard, heavy cross sea. After 2 a. m. of the 11th, wind gradually veered, and at 6 a. m., it was s. by w., barometer 29.46 (748.3), wind moderating; 10 a. m., wind wnw., strong gale, heavy cross sea and squally, barometer 29.54 (750.3)." During the 11th, moderate s. winds were reported to the eastward of the twentieth meridian, and by the following day, the depression had moved, with increasing pressure, northeastward.

5.—This disturbance was shown near N. 48° W. 37° on the 13th by the following vessel-reports: s. s. "Republic," P. J. Irving, commanding, in N. 48° 31', W. 34° 20', reported barometer 29.62 (752.3), wind se., force 7, overcast and rainy; s. s. "Edam," J. H. Taat, commanding, in N. 46° 17', W. 36° 16', barometer 29.74 (753.0), wind wsw., force 6; drizzling rain; s. s. "Moravia," O. Petzoldt, commanding, in N. 46° 27', W. 38° 40', barometer 29.53 (750.0) wind w., force 4, covered; s. s. "Hermann," H. Baur, commanding, in N. 48° 41', W. 34° 43', barometer, 29.78 (756.4) wind e. by s., force 5, overcast and hazy; s. s. "Arizona," S. Brooks, commanding, in 49° 22', W. 38° 16', barometer 29.84 (757.9) wind nne., force 6, overcast and rainy. Captain Müller, commanding the bark "Johanne" reported as follows: "13th, at noon, Greenwich time, in N. 46° 35', W. 30° 14', wind began to increase in force; 2 p. m., strong s. by e. gale, heavy rain; 6 p. m., lat. 46° 39' N., long. 30° 35' W., wind wore to sw. by w., moderating, barometer 29.65 (753.1). After 10 p. m. the wind backed to ssw., moderate breeze, heavy cross sea; at 4 a. m. on the 14th it fell calm, barometer 29.56 (750.8); 8 a. m. it began to breeze up from the north." In the above reports the decrease of pressure during the twenty-four hours interval between the

observation of the 12th and that of the 13th, ranged from .25 inch to .60 inch. By the 14th the area of least pressure occupied the ocean between N. 48° and 52° and W. 30° and 20°, where the barometer ranged from 29.5 (749.3) to 29.7 (754.4), with variable winds; to the westward of the thirtieth meridian the winds had now shifted to northerly and blew with the force of a moderate gale, and to the eastward of the twentieth meridian they were mostly southerly and moderate in force. On the 15th the disturbance was off the west coast of Ireland, the lowest reported barometer being 29.72 (754.9).

6.—This was a depression which appeared north of the fifty-fifth parallel on the 15th. At the observation of that date the barometer on board the s. s. "Ontario," W. P. Couch commanding, read 29.67 (753.6), being a fall of about .15 inch, wind sw. by w., overcast and hazy, (ship's position, N. 55° 50', W. 34° 15'). During the three succeeding days the disturbance appears to have moved slowly eastward, the reports showing the prevalence of southerly winds and low pressures between W. 20° and 10°.

7.—During the 18th there was a decrease of pressure over the region between N. 45° and 50°, and W. 45° and 35°. On the 19th the lowest barometric readings were reported by the s. s. "Iowa," S. Walters commanding, in N. 50° 26', W. 29° 25', barometer 29.39 (745.5), wind s., force 6, misty; and by the s. s. "Furnessia," J. Hedderwick commanding, in N. 52° 46', W. 30° 50', barometer 29.53 (750.0), wind sse., force 6, showery. By the morning of the 20th the pressure had increased to 29.9 (759.4) and the depression was disappearing from the chart.

8.—This was probably a continuation of the depression traced over the United States and Canada as low area vi. At midnight of the 31st, the disturbance was north of Anticosti Island, and on the morning of the 22d it was to the eastward of the strait of Belle Isle, after which it probably passed northeastward beyond the field of observation.

9.—This was probably identical with the depression traced as low area vii. On the morning of the 24th, the centre was over the northern part of the Gulf of Saint Lawrence, and by the 25th, it had passed northeastward beyond the strait of Belle Isle. On that date the s. s. "Brooklyn," G. S. Dale commanding, reported, in N. 50° 27', W. 58° 16', barometer 29.62 (752.3), rising, wind nw., force 4, clear.

10.—This was a continuation of the disturbance traced over the continent as low area viii. It passed over the Gulf of Saint Lawrence and Newfoundland during the 27th, and its approach was indicated on the 28th, by the falling barometer and change of wind experienced by the s. s. "Brooklyn." On the 28th, that vessel, in N. 55° 19', W. 36° 58', reported, barometer 29.73 (755.1), a fall of about .3 inch, wind se., force 2, drizzling rain; vessels near the fiftieth parallel and between W. 35° and 45° had moderate to strong w. and sw. winds. By the 29th the disturbance had passed to the northward of the "Brooklyn"; in N. 55° 29', W. 28° 44' the barometer read 29.59 (751.6), and the wind had shifted to w., force 5, drizzling rain. The depression continued its easterly movement and at the close of the month it was central to the northward of Scotland.

OCEAN ICE.

Chart i. also exhibits the southern and eastern limits of the region within which icebergs were observed in the north Atlantic ocean during the month of August, 1884. These limits are determined from reports sent to this office by shipmasters, reports furnished through the co-operation of the "New York Herald Weather Service," and from other data published in the "New York Maritime Register."

In August, 1884, the southernmost limit of the ice region was in N. 43° 30', but only three or four isolated bergs were observed south of N. 45°; the eastern limit extended to W. 43° 50'. The reports indicate that the region within which icebergs were most numerous was that between N. 46° and N. 49°, and W. 46° and W. 48°. The strait of Belle Isle continued full of icebergs throughout the month.

As compared with the chart for the preceding month (July) there appears to have been a slight but general drift of icebergs towards the south and east; later newspaper reports, however, indicate an extensive southerly movement of icebergs along the eastern coast of Newfoundland. So far as can be determined from the reports at hand, the region south of N. 45° appears to be comparatively clear of ice.

A comparison with the chart for the corresponding month of last year (1883) shows no material difference in the extent of the ice region, either in its eastern or southern limits. In 1883, as in the present year, only a few isolated bergs were observed south of N. 45°; in the strait of Belle Isle more ice has been reported this year than in the two preceding years; in 1883 the strait was clear of ice.

As regards August, 1882, the limits of the ice region during that month were not shown on the chart, the small area covered by the reports, rendering unnecessary the issue of such chart. No icebergs were reported after August 16, 1882, and those observed prior to that date were between N. 46°, W. 46° and N. 48° W. 48°.

Icebergs were reported during August, 1884, as follows:

3d.—Bark "Republik," in N. 48°, W. 45°, passed a large iceberg.

5th.—Bark "Orpheus," in N. 48° 20', W. 44° 40' passed two large icebergs; s. s. "State of Nebraska," in N. 47° 24', W. 47°, passed an iceberg.

6th.—Ship "Dora," in N. 48° 56', W. 48° 38', passed two very large icebergs about two hundred feet high, also several small pieces from twenty to forty feet high.

7th.—Ship "Dora," in N. 48° 20', W. 48° 35', passed six very large icebergs ranging from about one hundred to five hundred feet high.

8th.—S. S. "State of Georgia," in N. 48° 31', W. 46° 40', passed an iceberg and several small pieces.

9th.—S. S. "State of Georgia," in N. 47° 8', W. 51° 14', passed two icebergs.

10th.—S. S. "Lake Huron," in N. 48° 50', W. 49° 10', passed several large and small icebergs; s. s. "Gallia," in N. 43° 24', W. 48° 44', passed a large iceberg.

11th.—S. S. "City of Richmond," in N. 47° 50', W. 43° 50', passed three icebergs; also, in N. 47° 15', W. 46° 27', passed two icebergs.

12th.—Bark "Orpheus," in N. 44° 15', W. 52° 0', passed two large icebergs.

14th.—S. S. "Arizona," in N. 47° 10', W. 47° 37', passed an iceberg about fifty feet high.

16th.—Captain Gamon, commanding the s. s. "Rhodora," reported: 16th, 7 p. m., lat. 48° 14' N., long. 43° 40' W., the thermometer in the chart room fell to 48° and kept steady at that point until 9 a. m. the next day, when we passed a large iceberg in N. 47° 20', W. 47° 8'; soon after, the thermometer rose to its usual height; did not see any ice during the night, though it was clear, but no doubt other icebergs were passed. The s. s. "Azalea," in N. 47° 38', W. 45° 36', passed a large iceberg; ship "Susanne," in N. 46° 57', W. 46° 9', passed an iceberg; s. s. "Wyoming," in N. 46° 23', W. 47° 8', passed a large iceberg.

17th.—S. S. "Donau," in N. 46° 28', W. 46° 4', passed an iceberg, also in N. 46° 2', W. 47° 33', passed one large and one small berg; temperature of air, 52° 7'; water, 46°; ship "Susanne," in N. 46° 25', W. 47° 30', saw two large icebergs.

19th.—S. S. "Egypt," in N. 45° 43', W. 48° 9', passed an iceberg.

20th.—S. S. "City of Berlin," in N. 46° 36', W. 45° 43', passed an iceberg and several small pieces; in N. 46° 10', W. 47° 30', passed two large icebergs.

24th.—Quebec, 24th.—Several incoming vessels report heavy masses of ice in the Gulf and Strait of Belle Isle. Some of the oldest mariners cannot recollect having encountered so much ice before at this time of the year.

27th.—Captain Dale, commanding the s. s. "Brooklyn" reported: Passed numerous icebergs and detached pieces from

Belle Isle eastward; last ice was seen in N. 52° 50', W. 50° 20'.

Saint Johns, N. F., Sept. 3d.—One hundred and forty-five icebergs lie between Wadham's Island and Trinity Bay, Newfoundland.

The "New York Maritime Register" of September 17th, publishes the following:

Three hundred and nineteen icebergs are now drifting southward between Cape Freels and Cape Race.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for August, 1884, is exhibited on chart ii. by the dotted isothermal lines; chart v. shows the departures from the normal.

On the Pacific coast; in the northern plateau; northern New England; and from southwestern Texas to Arizona, the mean temperature for August, 1884, is slightly above the normal, the departures being greatest in the north Pacific coast region. In all other parts of the United States the mean temperatures are normal or below. The greatest departures below the normal are shown over an area extending eastward from Wyoming and Colorado to the Mississippi river, where they are from 4° to 6°. Over the country north of the thirty-fifth parallel of latitude and between the eighty-fifth meridian and the Rocky mountains, the departures below the normal temperature are from 2° to 5°.

In the following table are shown the normal temperatures for the month of August for a series of years; the mean temperatures for August, 1884, and the departures from the normal for each of the several geographical districts, as deduced from the records of the Signal Service:

Average temperatures for August, 1884.

Districts.	Average for Aug. Signal-Service observations.		Comparison of Aug., 1884, with the average for several years.
	For several years.	For 1884.	
	°	°	°
New England	67.9	67.6	0.3 below.
Middle Atlantic states.....	73.6	73.2	0.4 below.
South Atlantic states.....	78.7	77.2	1.5 below.
Florida peninsula	82.4	81.6	0.8 below.
Eastern Gulf states.....	79.4	78.3	1.1 below.
Western Gulf states.....	81.5	80.2	1.3 below.
Rio Grande valley.....	82.7	82.2	0.5 below.
Tennessee.....	77.0	75.2	1.8 below.
Ohio valley.....	74.9	73.1	1.8 below.
Lower lake region.....	69.7	67.9	1.8 below.
Upper lake region.....	66.9	64.4	2.5 below.
Extreme northwest.....	66.4	64.4	2.0 below.
Upper Mississippi valley.....	74.1	70.9	3.2 below.
Missouri valley.....	73.5	69.5	4.0 below.
Northern slope.....	67.6	65.3	2.3 below.
Middle slope.....	73.2	70.4	2.8 below.
Southern slope.....	76.8	78.1	1.3 above.
Southern plateau.....	79.2	78.5	0.7 below.
Northern plateau.....	68.9	71.8	2.9 above.
North Pacific coast region.....	63.4	66.8	3.4 above.
Middle Pacific coast region.....	70.1	70.9	0.8 above.
South Pacific coast region.....	76.2	76.6	0.4 above.
Mount Washington, N. H.	47.2	47.7	0.5 above.
Pike's Peak, Colo.....	39.0	35.6	3.4 below.
Salt Lake City, Utah.....	75.3	72.6	2.7 below.

The following are some of the highest and lowest monthly mean temperatures reported from the Signal Service stations:

Stations reporting highest.	Stations reporting lowest.
Key West, Florida..... 83.9	Pike's Peak, Colorado..... 35.6
Galveston, Texas..... 83.8	Mount Washington, New Hampshire... 47.7
Phoenix, Arizona..... 83.7	Cape Mendocino, California..... 56.0
Wickenburg, Arizona..... 83.4	Port Angeles, Washington Territory... 58.1
Rio Grande City, Texas..... 83.2	Fort Bridger, Wyoming..... 58.7
New Orleans, Louisiana..... 82.3	San Francisco, California..... 58.7
Indianola, Texas..... 81.9	Pysht, Washington Territory..... 59.1
Red Bluff, California..... 81.5	Fort Stanton, New Mexico..... 59.4
Brownsville, Texas..... 81.3	Fort Maginnis, Montana..... 60.8
Cedar Keys, Florida..... 81.2	Eastport, Maine..... 61.0
Fort Concho, Texas..... 81.2	Saint Vincent, Minnesota..... 61.7
Fort Thomas, Arizona..... 81.0	Alpena, Michigan..... 62.0
Shreveport, Louisiana..... 80.2	Mackinaw City, Michigan..... 62.2

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average temperatures for August, 1884. Voluntary observers report the following notes in connection with this subject:

Arkansas.—Lead Hill, Boone county: mean temperature, 76°.2, is 0°.1 above the August average of the two preceding years.

Dakota.—Webster, Day county: mean temperature, 71°.3, is 4°.3 below the August average of the two preceding years.

Illinois.—Mattoon, Coles county: mean temperature, 72°.7, is 4°.2 below the August average of the last four years.

Anna, Union county: mean temperature, 75°.2, is 1°.8 below the August average of the last nine years. The highest August mean of that period, 85°.5, occurred in 1879.

Riley, McHenry county: mean temperature, 65°.8, is 2°.8 below the August average for last twenty-three years, and in only three years during that period has the month of August been colder than that of the present year, viz: in 1866, 1868, and 1875. The mean temperature for the summer of 1884, is 66°.4, or 2°.3 below the summer average for the last twenty-three years; only the summers of 1875 and 1882 were colder.

Swanwick, Perry county: mean temperature, 73°.0, is 2°.4 below the August average for the last three years.

Collinsville, Madison county: mean temperature, 72°.3, corresponds to that for August, 1875, which was an unusually cool month.

Sycamore, De Kalb county: mean temperature, 65°.5, is 5°.9 below the August average for the three preceding years.

Indiana.—Wabash, Wabash county: mean temperature, 71°, is 1° below the August average for the last eight years.

Logansport, Cass county: mean temperature, 71°.8, is 2°.3 below the August average of the last twenty-five years.

Kansas.—Independence, Montgomery county: mean temperature, 72°.8, is 5°.9 below the August average for the last thirteen years.

Yates Centre, Woodson county: mean temperature, 73°.5, is 2°.9 below the August average of the last four years.

Wellington, Sumner county: mean temperature, 70°.1, is 6° below the August average for the last six years.

Maine.—Gardiner, Kennebec county: mean temperature, 65°.7, is 1° below the August average of the last forty-eight years.

Maryland.—Fallston, Harford county: mean temperature, 71°.2, is 0°.7 below the August average for the last ten years.

Massachusetts.—Worcester, Worcester county: mean temperature, 68°.5, is 0°.4 below the August average for the three preceding years.

Missouri.—Saint Louis: mean temperature, 74°.4, is 2°.1 below the August normal for Saint Louis.

New Jersey.—South Orange, Essex county: mean temperature, 69°.8, is 1°.7 below the August average for the last fourteen years. The mean temperature for the summer of 1884 is 69°.1, and is the lowest summer average of the last fourteen years.

New York.—Palermo, Oswego county: mean temperature, 66°.1, is 1°.3 below the average for the last thirty-one years.

North Volney, Oswego county: mean temperature, 68°.5, is 0°.3 above the average of the last seventeen years.

Ohio.—Wauseon, Fulton county: mean temperature, 68°.4, is 1°.5 below the August average of the last fourteen years. The mean temperature for the summer months (June, July and August), of 1884, is 69°.3, or 1° below the summer average of the last fourteen years.

Pennsylvania.—Dyberry, Wayne county: mean temperature, 65°.6, is 0°.3 above the August average for the last seventeen years. The minimum temperature (34°), on the morning of the 25th, is 3° lower than the lowest previously recorded during August.

Texas.—New Ulm, Austin county: mean temperature, 82°.6, is 0°.3 above the August average for the last thirteen years.

Table of maximum and minimum temperatures for August, 1884.

State or Territory.	Signal Service.			U. S. Army Post Surgeons, or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
Alabama.....	Montgomery.....	97	62	Marion.....	104	58
Do.....	Mobile.....	90	63	Calera.....	100	53
Arizona.....	Wickenburg.....	115	52	Fort McDowell.....	113	50
Do.....	Prescott.....	92	41	Texas Hill.....	120	71
Arkansas.....	Fort Smith.....	104	58	Devall's Bluff.....	104	50
Do.....	Little Rock.....	99	59	Newport.....	102	40
California.....	Red Bluff.....	107	55	Mammoth Tank.....	128	85
Do.....	Cape Mendocino.....	68	47	Cisco.....	79	24
Colorado.....	West Las Animas.....	101	52	Grand Junction.....	104	52
Do.....	Pike's Peak.....	49	23	Pueblo.....	91	54
Connecticut.....	New Haven.....	90	46	Voluntown.....	94	50
Do.....	New London.....	86	48	Hartford.....	96	42
Dakota.....	Fort Buford.....	100	44	Fort Buford.....	102	39
Do.....	Deadwood.....	83	40	Fort Meade.....	96	34
Delaware.....	Del. Breakwater.....	92	66			
District of Columbia.....	Washington City.....	95	57	Distributing Res'tr.....	98	60
Florida.....	Sanford.....	97	70	Waldo.....	96	66
Do.....	Pensacola.....	94	66	Fort Barrancas.....	96	67
Georgia.....	Augusta.....	94	64	Washington.....	103	52
Do.....	Atlanta.....	82	60	Camak.....	100	58
Idaho.....	Lewiston.....	101	48			
Do.....	Coeur d'Alene.....	94	39	Bunker Hill.....	98	45
Illinois.....	Springfield.....	91	49	Peoria.....	97	50
Do.....	Chicago.....	91	51	Fort Wayne.....	96	52
Indiana.....	Indianapolis.....	89	50	Spicefield.....	92	46
Indian Territory.....	Fort Sill.....	102	58			
Do.....	Cantonment.....	95	51	Fort Madison.....	93	59
Iowa.....	Des Moines.....	91	49	Muscatine.....	92	43.5
Do.....	Davenport.....	88	44	Yates Centre.....	100	47
Kansas.....	Dodge City.....	94	55	Westmoreland.....	95	48
Do.....	Leavenworth.....	93	50	Richmond.....	91	56
Kentucky.....	Louisville.....	92	57	Frankfort.....	90	49
Do.....				Minden.....	103	58
Louisiana.....	Shreveport.....	104	64	Cheneyville.....	98	56
Do.....	New Orleans.....	93	66	Cornish.....	91	47
Maine.....	Portland.....	88	53	Woodstock.....	89	44
Do.....				Woodstock.....	92	47
Maryland.....	Baltimore.....	94	59	Great Falls.....	92	58
Do.....	Ocean City.....	88	62	Taunton.....	93	50
Massachusetts.....	Boston.....	94	51	Princeton.....	90	43
Do.....	Thatcher's Island.....	84	55	Hudson.....	96	40
Michigan.....	Port Huron.....	92	47	Fort Brady.....	88	35
Do.....	Alpena.....	91	39	Minneapolis.....	90	51
Minnesota.....	Saint Paul.....	90	50	Fort Snelling.....	101	45
Do.....	Saint Vincent.....	89	38	Hernando.....	100	54
Mississippi.....	Vicksburg.....	98	62	Oxford.....	96	56
Do.....				Miami.....	96	52
Missouri.....	Saint Louis.....	92	54	Centerville.....	94	44
Do.....						
Montana.....	Fort Custer and Poplar River.....	100	43	Fort Keogh.....	103	39
Do.....	Fort Benton.....	99	30	Fort Assinaboine.....	95	37
Nebraska.....	Omaha.....	88	53	Red Willow.....	96	47
Do.....	North Platte.....	92	48	Fort Robinson.....	97	42
Nevada.....				Golconda.....	105	60
Do.....				Wells.....	88	40
New Hampshire.....	Mount Washington.....	65	22			
New Jersey.....	Sandy Hook.....	91	59	Readington.....	100	56
Do.....	Cape May.....	86	57	Salem City.....	95	48
New Mexico.....	Fort Craig.....	101	55	Fort Union.....	92	43
Do.....	Fort Stanton.....	89	38	Lordsburg.....	102	70
New York.....	Oswego.....	93	44	North Volney.....	97	49
Do.....	Rochester.....	92	43	Factoryville.....	93	30
North Carolina.....	Kitty Hawk.....	93	68	Chapel Hill.....	99	56
Do.....	Charlotte.....	92	58	Highlands.....	82	52
Ohio.....	Sandusky.....	93	54	Jacksonburg.....	99	44
Do.....	Toledo.....	92	48	Wauseon.....	94	39
Oregon.....	Ashland.....	106	44	Albany.....	96	52
Do.....	Lakeview.....	90	38	Bandon.....	73	45
Pennsylvania.....	Pittsburg.....	98	52	Easton.....	98	62
Do.....	Erie.....	89	51	Wellsborough.....	95	30
Rhode Island.....	Narragansett Pier.....	81	46			
Do.....	Point Judith.....	79	49	Anderson.....	100	60
South Carolina.....	Charleston.....	91	68	Greenville.....	95	57
Do.....				Milan.....	99	54
Tennessee.....	Memphis.....	97	62	Paris.....	95	52
Do.....	Nashville.....	94	56	Paris.....	104	60
Texas.....	El Paso.....	110	63	Fort Concho.....	103	60
Do.....	Fort Elliott.....	101	54	Nephi.....	92	40
Utah.....	Fort Thornburg.....	95	42	Promontory.....	106	54
Do.....	Salt Lake City.....	92	49	Charlotte.....	98	54
Vermont.....				Dorset.....	93	35
Do.....				Summit.....	95	55
Virginia.....	Lynchburg.....	92	58			
Do.....	Cape Henry and Norfolk.....	92	65	Wytheville.....	86	48
Washington Territory.....	Dayton.....	102	42	Fort Spokane.....	103	44
Do.....	Port Angeles.....	79	41	Pleasant Grove.....	95	37
West Virginia.....				Helvetia.....	90	48
Wisconsin.....	Milwaukee.....	88	48	Prairie du Chien.....	90	51
Do.....	La Crosse.....	86	52	Neillsville.....	89	37
Wyoming.....	Cheyenne.....	86	40	Fort Fred Steele.....	91	38
Do.....	Fort Bridger.....	82	35	Fort Bridger.....	84	31

Vermont.—Woodstock, Windsor county: mean temperature, 66°.9, is 1°.8 above the August average for the last seventeen years. The highest August mean in that period was 68°.4, in 1877; the lowest was 60°.7, in 1869.

Virginia.—Wytheville, Wythe county: mean temperature,

68°.0, is 3° below the August normal for a period of nineteen years.

Variety Mills, Nelson county: mean temperature, 71°.3, is 2°.1 below the August average for the last seven years. The

mean temperature for the summer months (June, July, and August) of 1884 is 71°.1, or 2°.6 below the summer average for the last seven years, and is the coolest summer for that period. West Virginia.—Helvetia, Randolph county: mean temper-

Table of comparative maximum temperatures for the month of August.

State or Territory.	Maximum for August, 1884, Signal Service.		Maximum since Signal-Service stations were opened—3 to 13 years.			Highest from any other source.			
	Station.	Tempera- ture.	Station.	Tempera- ture.	Year.	Place.	Tempera- ture.	Year.	Length of record.
Alabama.....	Montgomery.....	97	Montgomery.....	103	1874	Mount Vernon Arsenal.....	104	1860	31
Do.....	Mobile.....	90	Mobile.....	100	1874	Mobile.....	90	1860	34
Arizona.....	Phoenix.....	115	Yuma.....	115	1879	Fort Mojave.....	119	1875	22
Do.....	Maricopa.....	112	Maricopa.....	112	1877	Camp McDowell.....	108	1875	7
Arkansas.....	Little Rock.....	99	Little Rock.....	102	1881	Fort Smith.....	102	1875	41
Do.....	Fort Smith.....	104	Fort Smith.....	101	1882	Washington (near).....	102	1875	28
California.....	Red Bluff.....	107	Red Bluff.....	110	1878	Fort Yuma.....	107	1879	32
Do.....	Los Angeles.....	103	Visalia.....	108	1879	Camp Gaston.....	114	1870	13
Colorado.....	Denver.....	92	Denver.....	105	1878	Fort Lyon.....	108	1868, 1869	31
Do.....	Pike's Peak.....	49	Pike's Peak.....	62	1878	Fort Garland.....	97	1875	31
Connecticut.....	New Haven.....	90	New Haven.....	90	73, 76, 81	New Haven.....	98	1864	87
Do.....	New London.....	86	New London.....	90	1873	Columbia.....	96	1864	10
Dakota.....	Yankton.....	86	Yankton.....	103	1873	Fort Randall.....	108	1863	33
Do.....	Fort Buford.....	100	Fort Buford.....	107	1882	Fort Lincoln.....	110	1870	12
Delaware.....	Delaware Breakwater.....	92	Delaware Breakwater.....	93	1881	Fort Delaware.....	102	1865	44
District of Columbia.....	Washington City.....	95	Washington City.....	101	1881	Washington City.....	101	1865	48
Florida.....	Jacksonville.....	94	Jacksonville.....	100	1874	Fort Barrancas.....	103	1879	60
Do.....	Key West.....	95	Key West.....	95	1880, 1881	Fort King.....	100	1833	10
Georgia.....	Augusta.....	94	Augusta.....	105	1878	Augusta Arsenal.....	100	1845	51
Do.....	Savannah.....	92	Savannah.....	100	1878	McPherson Barracks.....	101	1877, 1881	7
Idaho.....	Boise City.....	95	Boise City.....	103	1879	Fort Boise.....	121	1871	17
Do.....	Lawson.....	101	Fort Lapwai.....	115	1882	Fort Lapwai.....	103	1881	11
Illinois.....	Springfield.....	91	Springfield.....	100	1881	Anna.....	109	1881	5
Do.....	Chicago.....	90	Chicago.....	103	1881	Chicago.....	102	1868	48
Indiana.....	Indianapolis.....	89	Indianapolis.....	101	1881	Laconia.....	105	1881	7
Do.....	Indianapolis.....	89	Indianapolis.....	101	1881	Vevay.....	104	1881	13
Indian Territory.....	Fort Gibson.....	102	Fort Gibson.....	106	1874	Fort Gibson.....	116	1834	53
Do.....	Fort Supply.....	100	Fort Supply.....	107	1881	Fort Sill.....	109	1871	3
Iowa.....	Des Moines.....	91	Des Moines.....	103	1881	Fort Madison.....	103	1871	22
Do.....	Keokuk.....	90	Keokuk.....	102	1873	Muscatine.....	104	1881	43
Kansas.....	Leavenworth.....	93	Leavenworth.....	107	1874	Fort Riley.....	108	1881	25
Do.....	Dodge City.....	94	Dodge City.....	102	1881	Fort Leavenworth.....	100	1881	51
Kentucky.....	Louisville.....	92	Louisville.....	105	1881	Newport Barracks.....	96	1870	28
Do.....	Louisville.....	92	Louisville.....	105	1881	Chillicothe.....	96	1870	28
Louisiana.....	Shreveport.....	104	Shreveport.....	105	1881	Baton Rouge.....	102	1860, 1877	55
Do.....	New Orleans.....	93	New Orleans.....	90	1874, 1877	Point Pleasant.....	104	1881	7
Maine.....	Portland.....	88	Portland.....	95	1876	Brunswick.....	98	1881	53
Do.....	Eastport.....	86	Eastport.....	95	1880	Hancock Barracks.....	97	1881	17
Maryland.....	Baltimore.....	94	Baltimore.....	98	1881	Fort Mifflin.....	100	34, 49, 72	50
Massachusetts.....	Boston.....	88	Boston.....	98	1881	Fort Washington.....	100	1864	38
Do.....	Ocean City.....	88	Ocean City.....	98	1881	New Bedford.....	98	1864	45
Michigan.....	Detroit.....	94	Detroit.....	97	1881	Marquette.....	91	1864	69
Do.....	Thatcher's Island.....	84	Thatcher's Island.....	93	1879, 1882	Marquette.....	100	1881	22
Minnesota.....	Port Huron.....	92	Port Huron.....	99	1881	Thosville.....	101	1881	3
Do.....	Moorhead.....	88	Moorhead.....	96	1881	Fort Ridgely.....	102	1881	11
Mississippi.....	Saint Paul.....	99	Saint Paul.....	101	1876	Fort Snelling.....	97	1876	62
Do.....	Vicksburg.....	98	Vicksburg.....	100	1883	Columbus.....	99	1876	10
Missouri.....	Starkville.....	89	Starkville.....	100	1882	Brookhaven.....	106	1875	5
Do.....	Saint Louis.....	92	Saint Louis.....	105	1882	Saint Louis.....	108	1834	46
Montana.....	Springfield.....	94	Springfield.....	108	1882	Allenton.....	103	1875	4
Do.....	Fort Benton.....	99	Fort Benton.....	108	1881	Fort Ellis.....	112	1875	14
Nebraska.....	Fort Custer.....	100	Fort Custer.....	108	1882	Fort Shaw.....	102	1875	6
Do.....	Omaha.....	88	Omaha.....	105	1874	Fort McPherson.....	102	1875	15
Nevada.....	North Platte.....	92	North Platte.....	103	1874	Richland.....	104	1875	9
Do.....	Winnemucca.....	88	Winnemucca.....	103	1882	Camp Halleck.....	104	1875	14
New Hampshire.....	Piche.....	96	Piche.....	96	1879	Camp McDermit.....	104	1870	8
Do.....	Mount Washington.....	65	Mount Washington.....	72	1879	Auburn.....	100	1870	5
New Jersey.....	Portsmouth.....	97	Portsmouth.....	97	1881	Portsmouth.....	97	1881	3
Do.....	Sandy Hook.....	91	Sandy Hook.....	96	1881	Atco.....	100	1881	7
Do.....	Little Egg Harbor.....	88	Little Egg Harbor.....	96	1882	Vineland.....	100	1881	7
New Mexico.....	La Mesilla.....	101	La Mesilla.....	107	1878	Fort Bascom.....	108	1870	6
Do.....	Fort Stanton.....	89	Santa Fe.....	97	1878	Fort McRae.....	107	1870	10
New York.....	Oswego.....	93	Oswego.....	97	1881	Auburn.....	110	1881	39
Do.....	Rochester.....	92	Rochester.....	96	1874, 1882	Lansingburg.....	104	1845	21
North Carolina.....	Charlotte.....	92	Charlotte.....	101	1881	Fort Johnson.....	101	1870	50
Do.....	Wilmington.....	90	Wilmington.....	99	1878	Weldon.....	107	1881	7
Ohio.....	Cincinnati.....	92	Cincinnati.....	101	1881	Cincinnati.....	100	1881	38
Do.....	Cleveland.....	89	Cleveland.....	99	1881	Bellefontaine.....	104	1881	7
Oregon.....	Umatilla.....	106	Umatilla.....	110	1882	Fort Dalles.....	104	1853	10
Do.....	Portland.....	94	Portland.....	95	1876	Fort Hoskins.....	103	1860	8
Pennsylvania.....	Pittsburg.....	92	Pittsburg.....	100	1881	Mount Joy.....	105	1869	9
Do.....	Philadelphia.....	95	Philadelphia.....	99	1881	Philadelphia.....	98	1881	123
Rhode Island.....	Newport.....	87	Newport.....	87	1876, 1879	Providence.....	95	1866	35
Do.....	New Shoreham.....	82	New Shoreham.....	82	1882	Fort Adams.....	92	1866	33
South Carolina.....	Charleston.....	91	Charleston.....	98	1881	Charleston.....	90	1752	104
Tennessee.....	Nashville.....	94	Nashville.....	104	1874	Humboldt.....	104	1871, 1874	4
Do.....	Memphis.....	97	Memphis.....	112	1882	Glenwood Cottage.....	98	1871	11
Texas.....	Rio Grande City.....	105	Rio Grande City.....	102	1877	Fort Clarke.....	113	1871	25
Do.....	El Paso.....	110	San Antonio.....	108	1877	Fort Graham.....	112	1852	4
Utah.....	Salt Lake City.....	92	Salt Lake City.....	101	1875	Camp Douglas.....	105	1871	25
Vermont.....	Burlington.....	97	Burlington.....	97	1876	Lunenburg.....	100	1864	20
Do.....	Burlington.....	97	Burlington.....	97	1876	Charlotte.....	102	1875, 1881	6
Virginia.....	Lynchburg.....	92	Lynchburg.....	100	1881	Alexandria.....	104	1863	11
Do.....	Cape Henry and Norfolk.....	92	Cape Henry.....	103	1881	Fortress Monroe.....	99	1851	56
Washington Territory.....	Dayton.....	102	Almota.....	109	1882	Fort Walla Walla.....	107	1879, 1880	12
Do.....	Olympia.....	92	Olympia.....	86	1882	Fort Vancouver.....	98	1881	18
West Virginia.....	Morgantown.....	92	Morgantown.....	92	1874, 1881	Flemington.....	93	1881	1
Wisconsin.....	Milwaukee.....	88	Milwaukee.....	98	1874	Fort Howard.....	100	23-26, 30	30
Do.....	La Crosse.....	86	La Crosse.....	96	1874, 1881	Fort Crawford.....	96	1876	26
Wyoming.....	Cheyenne.....	86	Cheyenne.....	96	1882	Fort Laramie.....	107	1876	27
Do.....	Fort Bridger.....	82	Fort Washakie.....	100	1882	Fort Fetterman.....	107	1869	5

ature, $66^{\circ}.1$, is $1^{\circ}.4$ below the August average for the last eight years.

Wisconsin.—Beloit, Rock county: mean temperature, $66^{\circ}.5$, is $3^{\circ}.2$ below the August average for thirty-five years.

MONTHLY RANGES OF TEMPERATURE.

The monthly ranges of temperature were greatest in the Rocky mountain regions and over the northern districts from the upper Missouri valley eastward to New England; they were least along the Atlantic and Gulf coasts and on the middle Pacific coast. The extreme ranges are 64° at Fort Benton, Montana, and 16° at Hatteras, North Carolina.

The following stations report monthly ranges of 50° or more:

Fort Benton, Montana, 64° ; Phoenix, Arizona, 63° ; Dayton, Washington Territory, 60° ; Wickenburg, Arizona, 60° ; Fort Buford, Dakota, 57° ; Fort Custer, Montana, 57° ; Poplar River, Montana, 57° ; Fort Shaw, Montana, 56° ; Cœur d'Alene, Idaho, 55° ; Fort Bennett, Dakota, 53° ; Fort Maginnis, Montana, 53° ; Lewiston, Idaho, 53° ; Spokane Falls, Washington Territory, 53° ; Willecox, Arizona, 53° ; Alpena, Michigan, 52° ; Fort Thomas, Arizona, 52° ; Lakeview, Oregon, 52° ; Red Bluff, California, 52° ; Fort Assinaboine, Montana, 51° ; Fort Thornburg, Utah, 51° ; Fort Totten, Dakota, 51° ; Maricopa, Arizona, 51° ; Marquette, Michigan, 51° ; Saint Vincent, Minnesota, 51° ; Prescott, Arizona, 50° .

Monthly ranges of 28° or less occurred, as follows: Hatteras, North Carolina, 16° ; Fort Macon, North Carolina, 20° ; Cape Mendocino, California, 21° ; Galveston, Texas, 22° ; Charleston, South Carolina, 23° ; Smithville, North Carolina, 23° ; San Francisco, California, 23° ; Cedar Keys and Key West, Florida, 23° ; Block Island, Rhode Island, 24° ; Indianola, Texas, 24° ; Jacksonville, Florida, 24° ; Savannah, Georgia, 24° ; Kitty Hawk, North Carolina, 25° ; Pike's Peak, Colorado, 25° ; Barnegat City, New Jersey, 26° ; Delaware Breakwater, Delaware, 26° ; Neah Bay, Washington Territory, 26° ; Ocean City, Maryland, 26° ; Sanford, Florida, 26° ; Brownsville, Texas, 27° ; Cape Henry, Virginia, 27° ; Wilmington, North Carolina, 27° ; Atlantic City, Cape May, and Little Egg Harbor, New Jersey, 28° ; Norfolk, Virginia, 28° ; New Orleans, Louisiana, 28° ; Pensacola, Florida, 28° .

GREATEST DAILY RANGES OF TEMPERATURE.

In the several districts the greatest daily ranges of temperature have varied as follows:

New England.—From 18° at Block Island, Rhode Island, on the 15th, to 32° at Eastport, Maine, on the 18th.

Middle Atlantic states.—From 17° at Barnegat City, New Jersey, on the 24th, to 28° at New York City, on the 15th, and at Washington City, District of Columbia, on the 19th and 20th.

South Atlantic states.—From 12° at Hatteras, North Carolina, on the 27th, to 24° at Charlotte, North Carolina, on the 14th.

Florida peninsula.—From 17° at Key West on the 30th to 20° at Cedar Keys on the 5th.

East Gulf states.—From 19° at New Orleans, Louisiana, on the 8th, to 26° at Vicksburg, Mississippi, on the 29th.

West Gulf states.—From 16° at Galveston, Texas, on the 6th, to 32° at Fort Smith, Arkansas, on the 31st.

Rio Grande valley.—From 24° at Brownsville, Texas, on the 9th, to 30° at Rio Grande City, Texas, on the 6th.

Tennessee.—From 24° at Nashville, on the 18th and 25th, to 26° at Knoxville, on the 27th.

Ohio valley.—From 23° at Louisville, Kentucky, and Cincinnati, Ohio, on the 13th and 16th, respectively, to 32° at Pittsburgh, Pennsylvania, on the 14th.

Lower lake region.—From 22° at Toledo, Ohio, on the 17th, to 31° at Oswego, New York, on the 25th.

Upper lake region.—From 19° at Chicago, Illinois, on the 11th, to 32° at Marquette, Michigan, on the 23d.

Extreme northwest.—From 32° at Moorhead, Minnesota, on the 8th and 11th, to 46° at Fort Buford, Dakota, on the 27th.

Upper Mississippi valley.—From 22° at La Crosse, Wisconsin,

Cairo, Illinois, and Saint Louis, Missouri, on the 14th, 26th, and 28th, respectively, to 29° at Dubuque, Iowa, on the 1st.

Missouri valley.—From 25° at Omaha, Nebraska, on the 22d, to 48° at Fort Bennett, Dakota, on the 31st.

Northern slope.—From 28° at Deadwood, Dakota, on the 12th, to 54° at Fort Benton, Montana, on the 26th.

Middle slope.—From 18° on the summit of Pike's Peak, Colorado, on the 26th, and 31° at Dodge City, Kansas, on the 5th, to 48° at West Las Animas, Colorado, on the 1st.

Southern slope.—From 33° at Fort Stockton, Texas, on the 12th, to 34° at Fort Concho, Texas, on the 1st.

Southern plateau.—From 30° at Fort Grant, Arizona, on the 3d, to 42° at Fort Apache, Arizona, on the 21st.

Middle plateau.— 30° at Salt Lake City, Utah, on the 30th.

Northern plateau.—From 24° at Boise City, Idaho, on the 29th, to 44° at Dayton, Washington Territory, on the 29th.

North Pacific coast region.—From 33° at Portland, Oregon, on the 21st, to 42° at Olympia, Washington Territory, on the 2d.

Middle Pacific coast region.—From 20° at San Francisco, California, on the 22d, to 36° at Red Bluff, California, on the 22d.

South Pacific coast region.—From 28° at San Diego, California, on the 15th, to 38° at Los Angeles, California, on the 6th and 29th.

FROSTS.

On chart iv., are shown the limits of the regions over which frosts occurred on the mornings of the 9th and 25th, with the minimum isothermal lines for the same dates. The frosts which occurred on the 9th were confined to the upper lake region, and were generally light, causing no serious injury. The frosts of the 25th occurred in New England, New York, northeastern Pennsylvania, and northern New Jersey, and in many localities were very destructive to vegetation.

The following notes relate to frosts which occurred during August:

Arizona.—Prescott: on the 19th a killing frost occurred three and one half miles south of this station, causing injury to vegetation.

Colorado.—Frosts occurred on the summit of Pike's Peak on the 15th, 22d, 24th and 30th.

Connecticut.—Bridgeport: reports from points along Housatonic and Naugatuck railroads, state that heavy frosts occurred on the morning of the 25th.

New Haven: on the morning of the 25th, a light frost occurred in the surrounding country, but it was not sufficiently heavy to cause injury to vegetation.

Bethel, Fairfield county: a light frost occurred in the low lands on the 25th, causing no damage. Frosts also occurred at Voluntown, New London county, and at Hartford on the same date.

Dakota.—A light frost occurred on the morning of the 21st.

Illinois.—Edginton, Rock Island county: a light frost occurred on the 8th, causing no damage.

Indiana.—Wabash, Wabash county: a light frost is reported to have occurred in neighboring localities on the morning of the 9th; temperature at 6 a. m., 49° .

Iowa.—Manchester, Delaware county: a frost, cutting tender vegetation, occurred on the morning of the 8th.

Cresco, Howard county: a light frost occurred in some localities in this county on the morning of the 23d.

Maine.—Cornish, York county: a light frost occurred in the lowlands on the morning of the 25th.

Massachusetts.—Taunton, Bristol county: a light frost occurred here and in neighboring localities on the morning of the 25th. Reports from Fall River, Westborough, and Williamstown state that frosts occurred at those places on the same date.

Michigan.—Thornville, Lapeer county: the frosts of the 9th and 10th, killed the corn and buckwheat on the low grounds. light frosts also occurred on the mornings of the 8th and 24th.

Swartz Creek, Genesee county: frost occurred on the morning of the 8th, when the temperature fell to 37° .

Frosts occurred at Lansing, Ingham county, and Traverse City, Grand Traverse county, on the 7th and 8th; at Ionia, Ionia county, on the 9th; and at Manistique, Schoolcraft county, on the 9th and 24th.

Escanaba: reports from points north of this station state that frosts occurred on the morning of the 7th; on the 8th, the first frost of the season occurred at Escanaba, that date being the earliest at which frost has occurred since the establishment of this station in 1871.

Port Huron: light frost occurred in the surrounding counties on the morning of the 10th. Corn, buckwheat, and vegetables were damaged. No frost occurred on the 10th in the county (Saint Clair), in which Port Huron is situated, but a light frost occurred on the morning of the 24th.

Alpena: frosts occurred on the mornings of the 9th, 10th, and 27th, causing no damage in this vicinity.

Nevada.—Carson City, Ormsby county: frosts occurred on the 20th and 21st.

New Hampshire.—Concord: a heavy frost occurred in the Merrimack valley during the night of the 24th–25th, causing considerable damage to vegetation. At Canaan, Grafton county, the temperature fell to 28°.

Berlin Mills, Coos county: a heavy frost occurred throughout this section on the morning of the 25th, causing considerable damage to crops in the lowlands. Nearly all garden vegetables are reported to have been destroyed.

Plymouth, Grafton county: a heavy frost occurred in this vicinity on the morning of the 25th, killing vines and damaging the corn crop.

New Jersey.—Readington, Hunterdon county: frost was seen on the morning of the 25th within one mile of this place.

Coldwell, Essex county: frost occurred in the lowlands on the 25th, causing no damage.

New York.—Rochester: a heavy frost, the first of this season, occurred on the morning of the 25th. Considerable damage was done to crops in this part of the state.

Albany: frost occurred at Berne, Albany county, on the morning of the 25th, vegetables were slightly injured.

Lyons, Wayne county: a heavy frost occurred throughout this section during the night of the 24–25th, causing a large amount of damage. The corn crop in Wayne county was almost entirely ruined, and it is estimated that about three-fourths of the buckwheat crop were destroyed. Hundreds of acres of peppermint were completely destroyed. In the eastern part of this county the tobacco crop was also injured.

Factoryville, Tioga county: the frost of the 25th killed buckwheat and other vegetation. A heavy fog protected the crops in the valleys.

Flushing, L. I., August 25th: farmers along the north shore of the island report a heavy frost last night, which has injured corn, cabbage, and potatoes to a considerable extent.

Montgomery, Orange county: there was a heavy frost in this section on the morning of the 25th. At Monticello, Sullivan county, the frost was also severe, and caused damage to vegetation.

Frosts also occurred at Le Roy, Genesee county, on the 24th; at North Volney, Oswego county; Ithaca, Tompkins county, and at Menand Station (near Albany), on the 25th; and at Cooperstown, Otsego county, on the 15th, 21st, and 30th.

Ohio.—Jacksonborough, Butler county: frost occurred on the 15th; minimum temperature, 44°.

Pennsylvania.—Blooming Grove, Pike county: frost occurred on the morning of the 25th.

Dyberry, Wayne county: the corn and buckwheat crops in the lowlands of this county were badly damaged by the frost of the 25th.

Erie: light frost is reported to have occurred near this place on the morning of the 25th.

Frost also occurred on the 25th at the following places in this state: Catawissa, Columbia county; Wellsborough, Tioga county; Quakertown, Bucks county; and Drifton, Luzerne county.

Vermont.—Chester, Windsor county: frost occurred on the morning of the 25th, causing considerable damage to crops.

Waterbury, Washington county: corn on the highlands in this county was damaged by the frost on the morning of the 25th. In the vicinity of Bennington, Bennington county, the fields of buckwheat were, in many places, entirely ruined.

Lunenburg, Essex county: the frost of the 25th killed the corn, beans, and other vegetables in the low lands.

Strafford, Orange county: a heavy frost occurred on the 25th, killing vines, etc.

Dorset, Bennington county: the frost which occurred during the night of the 24–25th caused slight damage to corn.

Frosts also occurred on the above date at Newport, Orleans county, and at Woodstock, Windsor county.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada, for August, 1884, as determined by the reports from nearly eight hundred stations, is exhibited on chart iii.

A comparison of the monthly precipitation with the average for August in former years, shows an excess over the northern and middle slopes; extreme northwest; northern part of the upper lake region; upper Mississippi and Missouri valleys; and in New England, the departures being greatest in the extreme northwest. In the lower lake region; Ohio valley and Tennessee; south Atlantic and Gulf states; Rio Grande valley; and southern slope, the precipitation for August is below the average. In the lower lake region, and middle and south Atlantic states, the deficiencies average less than 1.00; while in the other districts named they average from 1.00 to more than 5.00. Along the immediate Gulf coast and in the Rio Grande valley, the monthly rainfall has been very light. At Rio Grande City, Texas, where the average precipitation for the month of August during the last six years is nearly six inches, no rain fell throughout the month, and at Pensacola, Florida, the monthly rainfall was but 2.07, the average for August at that place in the four preceding years being more than 12.00. At New Orleans, Louisiana, there was a deficiency of more than 5.00 as compared with the average for the last thirteen years.

The first column of the following table shows the average precipitation for the month of August in each of the various districts as determined from the Signal Service observations for a series of years; in the second column are given the averages for August, 1884; and the third column shows the excess or deficiency of August, 1884, as compared with the average.

Average precipitation for August, 1884.

Districts.	Average for Aug. Signal-Service observations.		Comparison of Aug., 1884, with the average for several years.
	For several years.	For 1884.	
	Inches.	Inches.	Inches.
New England.....	3.88	5.39	1.51 excess.
Middle Atlantic states.....	4.80	3.80	0.94 deficiency.
South Atlantic states.....	6.38	5.68	0.70 deficiency.
Florida peninsula.....	7.47	5.49	1.98 deficiency.
Eastern Gulf states.....	6.01	2.00	4.01 deficiency.
Western Gulf states.....	3.74	1.96	1.78 deficiency.
Rio Grande valley.....	5.63	0.44	5.19 deficiency.
Tennessee.....	3.89	2.85	1.04 deficiency.
Ohio valley.....	3.49	2.28	1.21 deficiency.
Lower lake region.....	2.83	2.24	0.59 deficiency.
Upper lake region.....	2.85	3.09	0.24 excess.
Extreme northwest.....	2.83	5.03	2.20 excess.
Upper Mississippi valley.....	2.39	2.99	0.60 excess.
Missouri valley.....	2.74	3.25	0.51 excess.
Northern slope.....	1.37	1.73	0.36 excess.
Middle slope.....	2.22	3.29	1.07 excess.
Southern slope.....	3.68	2.96	0.72 deficiency.
Southern plateau.....	2.86	2.35	0.51 deficiency.
Northern plateau.....	0.31	0.19	0.12 deficiency.
North Pacific coast region.....	0.82	0.64	0.18 deficiency.
Middle Pacific coast region.....	0.02	0.01	0.01 deficiency.
South Pacific coast region.....	0.16	0.11	0.05 deficiency.
Mount Washington, N. H.....	7.54	8.63	1.09 excess.
Pike's Peak, Colo.....	4.45	0.25	4.20 deficiency.
Salt Lake City, Utah.....	0.86	0.73	0.13 deficiency.

The rainfall for the middle Atlantic states averaged 0.98 below the normal, it was largely in excess in the vicinity of New York City, and slightly above the average at stations on the New Jersey coast, while in Maryland and Virginia the deficiencies varied from 1.40 at Lynchburg, Virginia, to 3.16, 3.94, and 4.06 at Norfolk, Virginia; Washington, District of Columbia; and Chincoteague, Virginia, respectively. Over the central and southern portions of Ohio and Indiana, the deficiencies exceeded 2.00.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average precipitation for August, 1884. Voluntary observers report the following notes in connection with this subject:

Arkansas.—Lead Hill, Boone county: monthly precipitation, 4.78, is 0.82 below the August average for the two preceding years.

California.—Oakland, Alameda county: the rainfall (0.25), on the 4th, was the first precipitation susceptible of measurement that has occurred at this place in August during the last eleven years.

Salinas, Monterey county: during the morning of the 3d, rain fell to a depth of 0.18, which is the first rainfall that has occurred at this place in August during the last thirteen years.

Connecticut.—Hartford: monthly precipitation, 2.87, is about 3.00 below the August average.

Illinois.—Mattoon, Coles county: monthly precipitation, 2.20, is 0.79 below the August average for the four preceding years.

Anna, Union county: monthly precipitation, 2.65, is 2.01 below the August average for the last nine years.

Riley, McHenry county: monthly precipitation, 2.36, is but 0.03 below the August average for the last twenty-three years; the total rainfall for the summer of 1884, is 11.77, or 0.25 above the summer average for the same period.

Swanwick, Perry county: monthly precipitation, 1.04, is 1.19 below the August average for the last three years.

Collinsville, Madison county: monthly precipitation, 1.82, is 2.23 below the August average.

Sycamore, DeKalb county: monthly precipitation, 3.43, is 1.74 in excess of the August average for the three preceding years.

Indiana.—Wabash, Wabash county: monthly precipitation, 2.18, is 0.83 below the August average for the last eight years.

Logansport, Cass county: monthly precipitation, 1.83, is 3.16 below the August average for the last twenty-five years.

Spiceland, Henry county: monthly precipitation, 0.40, is, with the exception of 0.30 in 1860, the smallest that has occurred in August during the last twenty-five years. In 1860, however, the precipitation for July was nearly 7.00, while in July, 1884, it was but 2.08.

Kansas.—Independence, Montgomery county: monthly precipitation, 5.83, is 3.22 in excess of the August average for a period of twelve years.

Yates Center, Woodson county: monthly precipitation, 1.51, is 0.53 below the August average for the four preceding years.

Wellington, Sumner county: monthly precipitation, 3.44, is 0.88 above the August average for the last six years.

Maine.—Gardiner, Kennebec county: monthly precipitation, 4.22, is 0.45 in excess of the August average for a period of forty-eight years.

Maryland.—Fallston, Harford county: monthly precipitation, 3.00, is 2.05 below the August average for the last twelve years.

Massachusetts.—Worcester, Worcester county: monthly precipitation, 3.72, is 1.12 below the August average for a series of many years.

Missouri.—Saint Louis: monthly precipitation, 1.39, is 2.66 below the August normal.

New Jersey.—South Orange, Essex county: monthly precip-

itation, 7.23, is 2.00 in excess of the August average for the last fourteen years. The precipitation for the summer of 1884 is 18.40, or 5.28 in excess of the summer average, and is, with the exception of 20.57 for the summer of 1875, the largest for the period of fourteen years.

New York.—Palermo, Oswego county: monthly precipitation, 2.19, is 0.34 below the August average for the last thirty-one years.

North Volney, Oswego county: monthly precipitation, 3.20, is 0.69 above the August average for the last thirteen years. The precipitation for the summer of 1884 is 6.85, or 2.35 below the summer average for thirteen years.

Ohio.—Wauseon, Fulton county: monthly precipitation, 1.12, is 1.81 below the August average for the last twelve years.

Pennsylvania.—Dyberry, Wayne county: monthly precipitation, 3.43, is 0.41 above the August average for the last thirteen years.

Texas.—New Ulm, Austin county: monthly precipitation, 0.21, is 3.03 below the August average for the last thirteen years.

Table of excessive and greatest monthly precipitation—August, 1884.

Station.	Specially heavy.		Largest monthly.	Station.	Specially heavy.		Largest monthly.
	Date.	Amt.			Date.	Amt.	
<i>Alabama.</i>				<i>Nebraska—Cont'd.</i>			
Clanton.....	3, 4	4.50	7.85	Red Willow.....	18	2.20	
Calera.....	28, 29	2.00		<i>New Hampshire.</i>			
<i>Arkansas.</i>				Mt. Washington..	29, 30	3.21	8.63
Fort Smith.....	14, 15	3.20		Bristol.....	22	3.08	6.50
Lead Hill.....	21	2.51		<i>New Jersey.</i>			
<i>Connecticut.</i>				South Orange....	4, 5	2.45	7.23
New London.....	7	2.32	7.15	Caldwell.....	4, 5	3.50	6.50
Bethel.....	30, 31	2.15	6.20	Do.....	29, 30	2.10	
New Haven.....	29, 30	2.27		Moorstown.....	4, 5	4.00	
Voluntown.....	21, 22	2.15		Cape May.....	4, 5	2.77	
<i>Dakota.</i>				Barnegat City....	7	2.00	
Webster.....	19	3.54	6.41	<i>New Mexico.</i>			
Richardton.....	16, 17	3.40	6.40	Fort Stanton.....	23	2.03	6.98
<i>Delaware.</i>				<i>New York.</i>			
Del. Breakwater..	4	2.03		Fort Columbus...	4, 5	3.71	8.72
<i>Florida.</i>				New York City...	4, 5	3.70	8.56
Sanford.....	16	2.14	11.09	Do.....	29, 30	2.25	
Do.....	27, 28	1.94		White Plains.....	4, 5	2.10	6.64
Saint Augustine..	30	2.26	10.02	Do.....	29, 30	3.02	
Limon.....	15, 16	2.05	8.82	Menand Station..	21, 22	2.04	6.16
Cedar Keys.....	5, 6	2.20	8.11	Buffalo.....	28, 29	2.43	
Mayport.....	5, 6	1.43	6.32	Albany.....	29	2.20	
<i>Georgia.</i>				<i>North Carolina.</i>			
Way Cross.....	11	3.50	10.12	Wilmington.....	1	3.11	9.58
Savannah.....	9, 10	1.95	8.41	Do.....	8	2.65	
Jesup.....	9, 10	4.15	7.86	New-Berne.....	1, 2	3.40	7.38
Do.....	23, 24	2.08		Do.....	4, 5	2.03	
Allapaha.....	19	2.02	6.74	Raleigh.....			7.25
Newton.....			6.00	Fort Macon.....	1, 2	2.05	6.86
Augusta.....	7	3.08		Kitty Hawk.....	6, 7	3.19	6.58
Albany.....	21, 22	3.05		Lumberton.....	1, 2	2.29	5.31
Griffin.....	1, 2	2.27		Do.....	6	2.04	
<i>Illinois.</i>				Goldsbrough.....	5	2.65	
Peoria.....	27, 28	2.60		Lenoir.....	8, 9	2.20	
<i>Iowa.</i>				Hatteras.....	6, 7	2.17	
Cresco.....	2	4.72	8.34	Chapel Hill.....	7	2.15	
Do.....	19, 20	2.34		Scott's Hill.....	5, 6	2.08	
Fort Madison.....	20, 27	4.50	6.87	<i>Pennsylvania.</i>			
Logan.....	12	2.80		Tamaqua.....	21, 22	3.11	7.13
<i>Kansas.</i>				Philadelphia.....	3, 4	2.85	
Sherlock.....	8, 9, 10	5.34	8.20	Blooming Grove..	4	2.20	
Do.....	23, 24	2.08		<i>Rhode Island.</i>			
Elk Falls.....	14	2.00	6.00	Point Judith.....	23	1.83	7.51
Independence.....	14	2.46		Narragansett Pier	7, 8	2.16	6.60
Dodge City.....	8, 9	2.42		Block Island.....	7	2.13	6.41
Leavenworth.....	24, 25	2.07		<i>South Carolina.</i>			
<i>Kentucky.</i>				Hardeeville.....	4, 5	3.55	9.34
Louisville.....	28, 29	2.58		Jacksonborough..	3	2.00	8.46
<i>Louisiana.</i>				Do.....	10	2.00	
Amite City.....	27	2.50		<i>Yemassee.....</i>			6.61
<i>Massachusetts.</i>				Charleston.....	6	2.12	6.12
New Bedford.....	7, 8	2.90	8.41	Branchville.....	22, 23	2.98	
Fall River.....			6.33	Greenwood.....	10	2.35	
Boston.....	6, 7	2.73		Blackville.....	22	2.09	
Thatcher's Island	7, 8	2.20		Cheraw.....	6, 7	2.05	
<i>Minnesota.</i>				<i>Texas.</i>			
Chester.....	2	2.99	7.79	Fort Davis.....	25, 26	5.55	6.70
Do.....	19	2.20		Clarkeville.....	4	2.82	
Saint Vincent.....	1, 2	4.58	7.18	El Paso.....	25, 26	3.31	
Duluth.....	19, 20	2.25	6.92	Brownsville.....	26	2.01	
Moorhead.....	18, 19	4.77	6.17	<i>Vermont.</i>			
<i>Mississippi.</i>				Dorset.....	29	2.12	
Lake.....	1, 2	4.83	6.80	<i>West Virginia.</i>			
Corinth.....	14	2.30		Helvetia.....	21	2.60	
<i>Missouri.</i>				<i>Wisconsin.</i>			
Miami.....			6.52	Embarras.....	2, 3	4.15	7.70
<i>Nebraska.</i>				Neillsville.....	19, 20	1.80	6.32
Omaha.....	12, 13	2.81	7.07	Manitowoc.....	3	2.77	
Do.....	16	2.13		Prairie du Chien..	19, 20	2.23	
Fremont.....			6.73	La Crosse.....	2	2.17	
Nebraska City.....			6.73	Ripon.....	2, 3	2.06	
De Soto.....	12, 13	2.30		Lancaster.....	19, 20	2.04	

Table of smallest monthly precipitation—August, 1884.

Station.	Amt.	Station.	Amt.
<i>Arizona.</i>		<i>Colorado.</i>	
Texas Hill	0.00	Pike's Peak	0.25
Yuma	Trace	<i>Dakota.</i>	
Benson	0.27	Fort Buford	0.25
Tucson	0.70	Fort Sully	0.72
Maricopa	0.56	Fort Bennett	0.74
<i>Arkansas.</i>		<i>District of Columbia.</i>	
Springfield	0.42	Distributing Reservoir	0.83
<i>California.</i>		Receiving Reservoir	0.87
Alta	0.00	<i>Idaho.</i>	
Anaheim	0.00	Lewiston	0.06
Aptos	0.00	Boise City	0.07
Auburn	0.00	Coeur d'Alene	0.17
Bishop Creek	0.00	<i>Indiana.</i>	
Boca	0.00	Spiceland	0.40
Borden	0.00	Indianapolis	0.40
Brentwood	0.00	Vevay	0.54
Brighton	0.00	Clinton	0.75
Byron	0.00	Fort Wayne	0.95
Calendon	0.00	<i>Louisiana.</i>	
Callente	0.00	Luling	0.86
Calistoga	0.00	New Orleans	0.87
Cisco	0.00	<i>Michigan.</i>	
Delano	0.00	Ionia	0.55
Daggett	0.00	Hillsdale	0.62
Davis	0.00	Mottville	0.70
Dunnigan	0.00	Swartz Creek	0.95
Emigrant Gap	0.00	<i>Montana.</i>	
Farmington	0.00	Helena	0.47
Galt	0.00	Fort Shaw	0.59
Goshute	0.00	Poplar River	0.68
Indio	0.00	Fort Benton	0.79
Ion	0.00	<i>Nebraska.</i>	
Keene	0.00	Fort Robinson	1.00
Kingburg	0.00	<i>Nevada.</i>	
Lemoore	0.00	Beowawe	0.00
Martinez	0.00	Elko	0.00
Marysville	0.00	Reno	0.00
Merced	0.00	Winnemucca	0.00
Napa	0.00	Fort McDermitt	Trace
Needles	0.00	Wadsworth	0.02
Newhall	0.00	Hot Springs	0.08
Niles	0.00	Battle Mountain	0.10
Orland	0.00	Golconda	0.10
Rocklin	0.00	Hawthorne	0.10
San Fernando	0.00	Tecoma	0.10
San José	0.00	Toano	0.13
South Vallejo	0.00	Halleck	0.14
Spadra	0.00	Wells	0.17
Stockton	0.00	Palisade	0.22
Summit	0.00	Carlin	0.20
Summer	0.00	Otero	0.60
Tehama	0.00	Carson City	0.62
Tulare	0.00	<i>New York.</i>	
Turlock	0.00	Fort Niagara	0.55
Williams	0.00	<i>Ohio.</i>	
Willows	0.00	College Hill	0.70
Woodland	0.00	Columbus	0.70
Antioch	Trace	North Lewisburg	0.80
Colfax	Trace	<i>Oregon.</i>	
Mammoth Tank	Trace	Ashland	0.00
Poway	Trace	Klamath Agency	0.00
Red Bluff	Trace	East Portland	0.03
Sacramento	Trace	Eola	0.17
San Mateo	Trace	Albany	0.43
San Diego	Trace	<i>Texas.</i>	
Hydesville	0.02	Rio Grande City	0.00
Los Angeles	0.02	Austin	0.04
Petaluma	0.02	New Uln	0.21
Benicia Barracks	0.03	Fort Brown	0.48
San Francisco	0.04	Cleburne	0.62
Hollister	0.05	Palestine	0.66
Menlo Park	0.05	Brownsville	0.88
Angel Island	0.06	<i>Utah.</i>	
Monterey	0.07	Blue Creek	0.00
Fort Bidwell	0.08	Promontory	0.00
Pleasanton	0.09	Terrace	0.05
San Rafael	0.09	Ogden	0.08
Livermore	0.10	Corinne	0.30
Mojave	0.10	Kelton	0.34
Soledad	0.10	Nephi	0.35
Santa Cruz	0.10	Salt Lake City	0.73
Tracy	0.10	<i>Virginia.</i>	
Gilroy	0.11	Snowville	0.24
Pajaro	0.15	Accotink	0.94
Salinas City	0.18	<i>Washington Territory.</i>	
Keeler	0.20	Pleasant Grove	Trace
Tennant	0.22	Dayton	0.09
Alcatraz Island	0.25	Fort Spokane	0.20
Colton	0.25	Spokane Falls	0.54
Oakland	0.25	Olympia	0.96
Ravenna	0.25	<i>Wyoming.</i>	
Cape Mendocino	0.32	Fort Bridger	0.45
Tehachapi	0.64	Fort Fred Steele	0.70
Truckee	1.00		

Vermont.—Woodstock, Windsor county: monthly precipitation, 2.12, is 0.37 below the August average of the last sixteen years.

Virginia.—Wytheville, Wythe county: monthly precipitation, 1.38, is 2.40 below the August normal.

Variety Mills, Nelson county: monthly precipitation, 2.03, is 1.65 below the August average for the last six years.

West Virginia.—Helvetia, Randolph county: monthly precipitation, 4.30, is 0.36 below August average of the last eight years.

HAIL.

Hail-storms occurred during August in the several states and territories as follows:

Arkansas.—Lead Hill, 27th; Little Rock, 30th.

Arizona.—Fort Bowie, 15th; Prescott, 9th, 18th; Fort Apache, 5th, 11th; Fort Verde, 11th. The hail-storm at Prescott on the 9th caused the destruction of crops in that vicinity.

Colorado.—Pike's Peak, 5th, 10th, 11th, 15th.

Dakota.—Deadwood, 28th. Reports from Grand Forks, Grand Forks county, state that during the night of the 28–29th a hail-storm occurred about two miles from that place on the Minnesota river. The width of the storm was about one mile; more than 1,000 acres of fine wheat were destroyed.

Indian Territory.—Cantonment, 1st; Fort Reno, 1st.

Iowa.—Oskaloosa, 29th.

Kansas.—Salina, 16th.

Kentucky.—Richmond, 22d.

Massachusetts.—Heath, 9th.

Minnesota.—Duluth, 10th; Saint Vincent, 5th, 27th.

Montana.—Fort Custer: a hail storm occurred on the afternoon of the 15th, lasting from 7.35 to 8.05 p. m. Government property at this post was damaged to the extent of \$300, about 1,500 window panes having been broken by the hail stones.

Nebraska.—Nebraska City, 2d; Fort Robinson, 20th.

New Hampshire.—Mount Washington, 26th.

Berlin Mills, Coos county: a violent thunder storm, accompanied by hail, passed over this place at 7 p. m. on the 26th.

New York.—Albany, 26th.

North Carolina.—Highlands, 20th.

Ohio.—Westerville, 21st.

Pennsylvania.—Dyberry, 30th; Chambersburg, 30th; Pittsburg, 16th.

Tennessee.—Austin, 3d; Milan, 29th.

Texas.—Fort Elliott, 4th, 5th; Fort Stockton, 30th.

Virginia.—Wytheville, 28th.

Washington Territory.—Port Angeles, 6th.

SNOW.

Snow fell on the summit of Pike's Peak, Colorado, on the following dates: 2d, 5th to 10th, 12th, 13th, 15th, 19th, 20th, 23d, the total depth of snow for the month amounting to about two inches.

Mr. Frank McClintock, voluntary observer at Grand Junction, Mesa county, Colorado, reports the following: "The last of the snow, visible from this place, on the peaks of the Grand Mesa, disappeared about the 25th. The elevation of the peaks is nearly 10,000 feet above the level of the sea."

Table of rainy and cloudy days, relative humidity, and dew-point for Aug., 1884.

Districts.	Rainy days.	Cloudy days.	Rel. humidity. °	Dew-point.
			Percentages.	
	From 12 to 14	From 4 to 9	From 78.3 to 89.3	From 55.1 to 64.4
New England	6 " 13	5 " 11	66.5 " 85.8	60.2 " 69.6
Middle Atlantic states	8 " 22	1 " 13	70.5 " 87.8	64.2 " 73.0
South Atlantic states	15 " 20	1 " 13	72.9 " 80.7	72.8 " 74.1
Florida peninsula	6 " 11	0 " 4	68.0 " 75.8	67.5 " 71.4
East Gulf states	2 " 12	0 " 6	68.8 " 77.5	66.6 " 73.8
West Gulf states	0 " 4	1 " 2	59.9 " 73.6	67.4 " 71.9
Rio Grande valley	4 " 41	2 " 6	68.8 " 79.3	63.2 " 66.9
Tennessee	6 " 9	2 " 4	58.8 " 68.6	50.7 " 62.8
Ohio valley	5 " 13	2 " 7	67.1 " 70.7	55.8 " 58.6
Lower lake region	8 " 17	2 " 9	68.3 " 77.7	51.4 " 57.7
Upper lake region	6 " 13	2 " 6	59.2 " 81.3	49.4 " 55.6
Extreme northwest	4 " 15	1 " 7	66.1 " 74.1	57.5 " 60.1
Upper Mississippi valley	2 " 11	3 " 5	61.2 " 75.5	53.7 " 61.7
Missouri valley	2 " 11	3 " 4	43.3 " 69.7	40.5 " 57.8
Northern slope	8 " 14	3 " 7	52.7 " 70.9	44.1 " 60.8
Middle slope	2 " 19	2 " 4	53.1 " 66.1	54.6 " 64.9
Southern slope	4 " 16	3 " 10	45.2 " 62.5	46.7 " 55.3
Southern plateau	1 " 3	0 " 1	41.8 " 80.4	43.0 " 54.5
Northern plateau	3 " 8	4 " 6	63.9 " 82.9	53.9 " 55.2
North Pacific coast region	0 " 1	0 " 7	38.1 " 87.3	50.8 " 57.5
Middle Pacific coast region	0 " 0	0 " 1	72.6 " 77.8	60.5 " 61.9
South Pacific coast region				
Mt. Washington, N. H.	Sixteen	Five	90.6	44.9
Pike's Peak, Colo.	Nine	Four	75.1	28.2
Salt Lake City, Utah	Three	Three	34.9	41.4

* Relative humidity corrected for altitude.

COTTON REGION REPORTS.

In the table below are shown the average precipitation and the means of the maximum and minimum temperatures for August, 1884, in the cotton region districts, with the August averages for the two preceding years. From a comparison of these averages it will be seen that in all of the districts, with the exception of that of Charleston, the precipitation was below the average; the deficiencies exceeding three inches in the districts of Atlanta and New Orleans. The means of the minimum temperatures were lower in all districts except for Charleston, while the means of the maximum temperatures do not show any marked departures:

Temperature and rainfall data for the cotton districts, August, 1884.

Districts.	Rainfall.			Temperature.								Extremes for Aug., 1884.	
	Average for Aug. of two preceding years.	Average for Aug., 1884.	Departures.	Maximum.				Minimum.					
				Mean for Aug. of two preceding years.		Mean for Aug., 1884.		Mean for Aug. of two preceding years.		Mean for Aug., 1884.			
				Departures.	Departures.	Departures.	Departures.	Departures.	Departures.				
New Orleans.....	5.54	1.93	- 3.61	90.4	92.4	+ 2.0	71.3	69.3	- 1.9	104	56		
Savannah.....	5.92	4.20	- 1.72	90.8	90.4	- 0.4	71.3	69.7	- 1.5	102	53		
Charleston.....	5.89	6.04	+ 0.15	90.2	88.5	- 1.7	68.7	69.1	+ 0.4	98	55		
Atlanta.....	5.51	2.05	- 3.46	87.4	88.0	+ 0.6	67.3	66.6	- 0.6	100	43		
Wilmington.....	4.60	3.75	- 0.85	88.2	88.3	+ 0.1	67.6	66.7	- 0.9	99	52		
Memphis.....	3.85	1.76	- 2.09	87.3	89.0	+ 1.7	66.1	64.7	- 1.4	100	45		
Galveston.....	3.17	1.61	- 1.56	94.0	93.9	- 0.1	71.8	68.6	- 3.2	104	47		
Vicksburg.....	3.63	3.33	- 0.30	90.8	90.6	- 0.2	69.7	68.0	- 1.7	100	57		
Montgomery.....	3.58	2.65	- 0.93	90.4	89.8	- 0.6	68.7	66.1	- 2.6	104	52		
Augusta.....	3.70	3.53	- 0.17	89.4	89.7	+ 0.3	68.4	66.1	- 2.3	103	54		
Little Rock.....	3.42	1.54	- 1.88	90.1	90.0	- 0.1	65.4	64.9	- 0.5	104	40		
Mobile.....	3.64	1.68	- 1.96	92.0	92.0	normal	69.4	67.5	- 1.9	106	50		

WINDS.

The most frequent directions of the winds during the month of August, 1884, are shown on chart ii. by arrows flying with the wind. In New England, the prevailing winds were southerly; in the middle Atlantic states they were northeasterly along the coast from Atlantic City, New Jersey, to Norfolk, Virginia, and southerly at the inland stations and at Sandy Hook, New Jersey, and New York City; in the south Atlantic states they were northeasterly; in the lake region, Ohio valley, east Gulf states, and in the north Pacific coast they were variable; in the extreme northwest, upper Mississippi and Missouri valleys, and in the west Gulf states they were mostly from the south.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	7,452	Eastport, Maine.....	3,133
Middle Atlantic states.....	Del. Breakwater, Del.....	9,193	Lynchburg, Va.....	1,890
South Atlantic states.....	Kitty Hawk, N. C.....	10,441	Augusta, Ga.....	2,818
Florida peninsula.....	Key West.....	5,356	Sanford.....	3,209
Eastern Gulf states.....	Pensacola, Fla.....	4,385	Montgomery, Ala.....	2,829
Western Gulf states.....	Indianola, Tex.....	6,610	Little Rock, Ark.....	2,533
Rio Grande valley.....	Rio Grande City, Tex.....	5,323	Brownsville, Tex.....	4,884
Tennessee.....	Nashville.....	3,100	Chattanooga.....	2,798
Ohio valley.....	Louisville, Ky.....	3,745	Cincinnati, Ohio.....	3,195
Lower lake region.....	Sandusky, Ohio.....	7,588	Toledo, Ohio.....	4,754
Upper lake region.....	Grand Haven, Mich.....	7,045	Chicago, Ill.....	4,996
Extreme northwest.....	Fort Totten, Dakota.....	9,828	Bismarck, Dak.....	5,858
Upper Mississippi valley.....	Saint Louis, Mo.....	7,411	Dubuque, Iowa.....	3,278
Missouri valley.....	Huron, Dak.....	7,030	Yankton, Dak.....	3,113
Northern slope.....	Cheyenne, Wyo.....	6,741	Denver, Colo.....	2,163
Middle slope.....	Dodge City, Kan.....	8,874	Fort Concho, Tex.....	4,475
Southern slope.....	Fort Stockton, Tex.....	7,146	El Paso, Tex.....	1,474
Southern plateau.....	Fort Grant, Ariz.....	3,828		
Middle plateau.....	Salt Lake City, Utah.....	3,492		
Northern plateau.....	Dayton, Wash. T.....	4,320		
North Pacific coast region.....	Fort Canby, Wash. T.....	5,503		
Middle Pacific coast region.....	Cape Mendocino, Cal.....	10,448		
South Pacific coast region.....	San Diego, Cal.....	4,397		

The total movements of the air on the summits of Mount Washington, New Hampshire and Pike's Peak, Colorado, were 20,870 and 9,113, respectively.

HIGH WINDS.

On the Summit of Mount Washington, New Hampshire, the following high velocities were registered: 71, nw., 1st; 60, nw., 2d; 52, s., 4th; 50, s., 5th and 6th; 60, n., 15th; 59, sw., 22d; 56, sw., 23d; 80, nw., 24th; 56, nw., 25th; 72, sw., 26th; 64, w., 27th; 88, (maximum), se., 29th.

Other stations reporting high velocities are as follows:

Cape Mendocino, California, 52, se., 2d.

Fort Custer, Montana, 52, nw., 15th.

Pike's Peak, Colorado, 52, w., 20th.

Cape May, New Jersey, 52, s., 22d.

Delaware Breakwater, Delaware, 53, sw., 22d.

Fort Assinaboine, Montana, 48, se., 27th.

Fort Maginnis, Montana, 48, nw., 1st.

Saint Paul, Minnesota, 46, se., 19th.

LOCAL STORMS AND TORNADOES.

California.—San Diego: at about 3 p. m. on the 22d a heavy rain and hail-storm occurred at Riverside, San Bernardino county. The most violent part of the storm was of about thirty minutes duration. About three inches of rain fell, flooding the cellars and submerging the streets. The width of the storm was about three miles, very little rain having fallen at Colton, and none at San Bernardino; some damage was caused by the high wind.

Dakota.—Huron, Beadle county: at 3 p. m. on the 28th a funnel-shaped tornado cloud was observed north of this station moving rapidly in a south-southeasterly direction. Nearly everything within the storm's path, which was from eighty to one hundred yards wide, was destroyed. It passed within three-fourths of a mile of Huron, travelling at an estimated velocity of forty miles per hour. The tornado passed through Beadle, Miner, Hanson, McCook and Hutchinson counties, and resulted in the loss of six lives. The maximum wind velocity at Huron during the passage of the tornado was twenty-three miles per hour.

Mitchell, Davison county: on the afternoon of the 28th, there were three funnel-shaped tornado clouds observed from this place. They were plainly visible and carried sand and dust to a great height into the air. A high wind prevailed at Mitchell, but no damage was done.

Sioux Falls, Minnehaha county: the storm of the 28th caused no damage at this place, but on a farm six miles north, a dwelling and all of the outbuildings were destroyed. A man, who was caught in the storm, was carried high into the air and thrown to the ground and instantly killed. The storm passed four miles west of Sioux Falls, leaving a well-defined path eighty yards in width. Four dwellings, with numerous other buildings, were destroyed, and a number of persons were killed.

Florida.—Jacksonville: a severe thunder storm accompanied by heavy rain prevailed at this place from 6.35 to 7.40 p. m. on the 8th. The storm moved from west to east, and was accompanied by a remarkable electrical display; considerable damage was done by lightning.

Illinois.—Cairo: a thunder storm, passing from northwest to southeast, occurred at 4 p. m. on the 27th. In thirty-seven minutes 1.12 inches of rain fell, and for five minutes the wind blew at the rate of thirty miles per hour. The storm which occurred on the 29th is reported to have caused considerable damage to the corn crop in Alexander county.

Carmi, White county: a severe wind and rain storm occurred on the morning of the 29th. Several buildings were damaged and the corn crop throughout this county was seriously injured. At the village of Centerville, eight miles north, much damage was done, and at Phillipstown a number of buildings were blown down.

Indiana.—Evansville, Vanderburg county: a violent storm visited this part of the Ohio valley on the morning of the 29th, during which the transfer steamer "Belmont," plying between Evansville, and Henderson, Kentucky, was capsized and sunk, when near Stanley's Landing. The storm struck the steamer when about five miles below Evansville, where she was capsized

after having forced her way through the storm for a distance of four or five miles. The number of lives lost is reported to have been from twelve to fifteen. The steamer had in tow a barge containing two passenger coaches with about sixty passengers, all of whom were saved. At Evansville, the storm caused damage estimated at \$250,000. Hundreds of houses were injured and a large number of trees were destroyed. One person was killed by the falling wall of a building that was demolished by the storm, and the steamers "Joseph V. Throop," and "Silver Horn," were badly damaged. The storm lasted more than one hour, the wind blowing from north-northwest to northeast.

Jeffersonville, Lawrence county: a severe wind and rain storm passed over this place on the evening of the 28th; no damage was done in this vicinity.

Indian Territory.—Mill Creek, Chickasaw Nation: at 7 a. m., on August 1st, a funnel-shaped, or tornado, cloud was observed moving in a northeasterly direction, but the cloud did not reach the ground, and no loss of life or property occurred.

Kansas.—Shawnee, Shawnee county: a tornado occurred in this county on the 24th. No lives were lost and but little damage resulted.

Sergeant J. E. Lanouette, Signal Corps, U. S. Army, at Dodge City, Kansas, reports the following relative to the storm of July 26th, at Cimarron, Ford county, Kansas (see reports from Dodge City and Sherlock, page 171, July REVIEW):

The storm occurred on July 26th, the time of its greatest violence, about 9 p. m., corresponding to the hour at which the maximum wind-velocity (84 miles per hour for five minutes) was registered at Dodge City. The wind which had been blowing at Cimarron with the force of a severe gale for about an hour, suddenly moderated at 8.55 p. m., and was followed by a calm of five minutes duration. After the calm, a furious gale set in, and continued for fifteen minutes, causing great damage to property. Numerous buildings were destroyed and several persons injured. At times the centre of the storm seems to have lifted from the ground, leaving objects untouched, and again striking the earth, destroying everything in its path. Several instances occurred which serve to illustrate the great force of the wind. Two tool chests about four feet in length, each weighing three hundred and fifty pounds, were carried a distance of ten rods; and a large draft wagon was entirely demolished, even the spokes being broken from the wheels, while another wagon standing near by was left undisturbed. Only the edge of the storm touched Dodge City.

Kentucky.—Louisville: a thunder-storm accompanied by heavy rain prevailed between 11.52 a. m. and 1.37 p. m. on the 21st. The storm moved from west to east, and caused considerable damage in the western part of the city. On the 28th a violent thunder-storm, accompanied by heavy rain and small hail, began at 10.28 p. m. and continued until 2 a. m. of the 29th. The heavy fall of rain caused much damage; the exposition building was flooded in some places to a depth of more than one foot, and a bridge over the Beargrass creek was washed away.

Bardstown, Nelson county: a storm occurred on the morning of the 29th, causing considerable damage to buildings and crops. At Bloomfield a large carriage factory was destroyed, and numerous bridges in that vicinity were washed away.

Uniontown, Union county: several buildings at this place were injured by the storm of the 29th. Great damage was done to the corn crop throughout the surrounding country.

Manitoba.—Winnipeg: a violent storm swept over this province during the night of the 27-28th, doing incalculable damage to property in various towns and damaging the crops. About fifty buildings in Winnipeg were damaged. At Portage la Prairie, sixty miles distant, the Canadian Pacific railroad sheds were blown down. At Headingly, fifteen miles west of Winnipeg, a mill was destroyed and a number of buildings were damaged.

Maryland.—Annapolis: the schooner "William Henry" was caught in a storm and sunk when off Cape Henry, Virginia, on the 27th.

Massachusetts.—Springfield: an unusually severe storm occurred on the afternoon of the 22d. Considerable damage was done to buildings and crops throughout the Connecticut valley. Several washouts occurred on the railroads.

Greenfield, Franklin county: the storm of the 22d caused

damage estimated at \$60,000 to the New London Northern railroad between Miller's Falls and Mann's Ferry. A large amount of damage was done to the crops.

Michigan.—Grand Haven: the schooner "C. O. D." was dismantled when north of Muskegon during a squall on the night of the 18th; damage \$1,100.

Escanaba: vessels on Lake Michigan report the occurrence of a severe storm on the morning of the 25th. The maximum velocity of the wind at Escanaba was 33 miles per hour. Captains of vessels that encountered the storm on the lake state that the wind attained a much greater force than the above.

Muskegon, Muskegon county: the schooner "W. W. Brigham," from Milwaukee to Chicago, at about midnight of the 24-25th, when in the middle of Lake Michigan, was struck by a violent south-southeasterly gale, which caused the vessel to spring a leak. The storm continued with but little abatement, and on the morning of the 25th the schooner was capsized.

Minnesota.—Saint Vincent: the rainfall accompanying the storm during the night of the 1-2d (3.99 inches) was the heaviest that has occurred since the establishment of this station. Farmers from surrounding localities report that the storm caused much damage to crops.

Missouri.—Independence, Jackson county: a very heavy rain storm occurred during the night of the 24-25th, more than four inches of rain having fallen. The storm was accompanied by high wind, which caused some damage to buildings.

New Hampshire.—Dover, Strafford county: this place was visited by a heavy thunder and rain storm, lasting several hours, on the afternoon of the 22d. Much damage was caused by lightning in this part of the state.

New Jersey.—Sandy Hook, at about 6 p. m., on the 30th, a severe squall occurred, during which the wind reached a velocity of forty miles per hour from the northwest.

New York.—Troy, Rensselaer county: during the rain and hail storm of the 21st, several buildings in Lansingburg, this county, were struck by lightning. In various places, trees were torn up, and fences destroyed. A mill at Stillwater, Saratoga county, was partly unroofed.

Albany: a heavy rain storm occurred on the afternoon of the 5th; considerable damage was done in this city by the flooding of cellars.

North Carolina.—Wash Woods: at 9 p. m. on the 31st, a violent storm occurred four miles north of this place. It was not accompanied by thunder or lightning, but heavy rain and hail fell. The width of the storm's path was about four miles; no damage was reported.

Ohio.—Akron, Summit county: a destructive storm, accompanied by hail, passed over Norton township, in this county, during the night of July 31st-August 1st. The width of the storm was about one-half mile, within which timber, fencing, and grain were prostrated. The fruit trees in numerous orchards were uprooted, and the grain shocks scattered.

Pennsylvania.—Pittsburg: between 5 and 6 p. m. on the 16th, one of the severest thunder-storms of the summer occurred. Rain fell in torrents accompanied by hail and high wind. Several buildings were struck by lightning and a frame dwelling was blown down. In all parts of Pittsburg and Allegheny City the cellars were flooded, and in some localities the streets were submerged to a depth of from two to three feet. One inch and eighty-five hundredths of rain fell in thirty-five minutes (from 5.35 to 6.10 p. m.) which is the heaviest precipitation for the same length of time that has occurred since the establishment of the signal office in this city. The storm was entirely local, the neighboring river stations reporting only a light fall of rain.

On the evening of the 21st, Callery Junction, on the Pittsburg and Western railroad, was visited by a violent storm which lasted about one hour. Several houses and many trees were blown down.

Rhode Island.—Point Judith: the most severe thunder storm of the summer prevailed at this station from 6.20 to 11 p. m.

on the 22d. The storm came from the southwest and passed off to the northeast.

Tennessee.—Chattanooga: a high easterly wind occurred at 5.15 p. m. on the 3d; small trees, etc., were blown down; no serious damage resulted. A violent thunder storm, moving from north to south, began at 8.65 a. m. on the 29th; it lasted fifteen minutes, and was accompanied by blinding sheets of lightning and heavy rain. Two dwellings were struck by lightning and some of the occupants were severely stunned.

Clarksville, Montgomery county: on the 22d a damaging hail storm passed through the southern and western portions of this county, causing, in many localities, total ruin to the tobacco crop. In a few farm houses the windows were broken by the hailstones.

Nashville: a severe storm occurred during the evening of the 29th. In the surrounding country trees were blown down and the crops damaged. The rain was very heavy and caused several small streams to overflow. Numerous buildings were struck by lightning. At 7 p. m. of the 29th a tornado occurred near Milan, Gibson county. As the funnel-shaped cloud did not reach the ground no loss of life or property occurred.

Texas.—Dallas, Dallas county: on the afternoon of the 23d a tornado cloud was observed approaching this place from the northeast. When first seen it was moving with great velocity at an altitude of several hundred feet. Before reaching this place it took an upward course and disappeared among the clouds, but immediately reappeared, striking the town near the south end of Lamar street. The cloud again bounded with great velocity, carrying a large column of sand to a height of five hundred feet, finally disappearing in the southwest.

Utah.—Salt Lake City: a "cloud burst" is reported to have occurred on the 8th, in City Creek cañon, about one mile from this place.

Virginia.—Fort Myer: a violent squall from the northwest occurred at 2.35 p. m. on the 21st; the wind attained a velocity of forty miles per hour.

Petersburg, Dinwiddie county: the adjoining county (Ches-terfield) lying north, was visited by a severe storm on the evening of the 21st, blowing down trees and outbuildings. In some places the storm was accompanied by hail and heavy rain, while in others the precipitation was very light.

Wisconsin.—Reedsburg, Sauk county: at 5 p. m. of the 2d a destructive tornado passed north of this village, pursuing an easterly course. It appears to have started in the vicinity of Cazenovia, Richland county, twelve miles west of Reedsburg, where numerous barns and dwellings were demolished, and extended eastward to near Lewiston, Columbia county. The storm cloud was observed to have a rotary motion, and its course throughout was marked by fallen timber, grain, fences, etc. It struck a heavy growth of timber about one mile west of Reedsburg, blowing down and breaking off the trees. The storm's path in that vicinity was about one-half mile wide, while in other localities its width was from ten to twenty rods. Its direction was east, ten degrees north, and its path was about thirty miles in length. No loss of life occurred.

Boscobel, Grant County: at 6.20 p. m. on August 22d a tornado, moved east, ten degrees north, with considerable destruction of property. Also on August 22d, at Montana, Buffalo county, at 4.30 p. m., a tornado, moving eastward, caused considerable destruction to property.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The observer at Nashville, Tennessee, reports that navigation on the Cumberland river was suspended throughout the month on account of the low stage of water.

During the latter part of the month the Tennessee river, at Chattanooga, was navigable only for boats of light draft.

The Ohio river was highest during the first decade of the month and lowest during the last decade. Reports from Vevay, Switzerland county, Indiana, state that numerous boats ran

aground opposite that place on account of the low stage of water during the latter part of the month.

In the upper Mississippi the difference between the highest and lowest stages was from one foot and three inches at Saint Paul, Minnesota and LaCrosse, Wisconsin, to two feet and five inches at Keokuk, Iowa. From Saint Louis, Missouri, to Vicksburg, Mississippi the range varied from seven feet eight inches, at the first named station to slightly over ten feet at Cairo, Illinois. At Saint Paul navigation was suspended on account of low-water on the 5th. The Missouri river was at its highest stage on the 1st, and was lowest from the 18th to 24th.

In the following table are shown the danger points at the various river stations, the highest and lowest stages for August, 1884, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, August, 1884.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>	<i>Ft. Ia.</i>		<i>Ft. Ia.</i>		<i>Ft. Ia.</i>	<i>Ft. Ia.</i>
Shreveport, Louisiana.....	29 9	1	6 8	31	1 6	5 2
<i>Arkansas:</i>						
Little Rock, Arkansas.....	33 0	1	8 0	18	3 11	4 1
Fort Smith, Arkansas.....	21, 26	†	0 10	13, 14	†	3 5
<i>Missouri:</i>						
Yankton, Dakota.....	20 0	1	17 3	23	14 10	2 5
Omaha, Nebraska.....	16 0	1	9 0	11, 12, 22, 23, 24	7 3	1 9
Leavenworth, Kansas.....	21 0	1	14 0	18	9 5	4 7
<i>Mississippi:</i>						
Saint Paul, Minnesota.....	14 6	30, 31	3 1	10	1 10	1 3
La Crosse, Wisconsin.....	18 0	3	2 3	18, 19	1 0	1 3
Dubuque, Iowa.....	21 10	7	5 5	17, 19, 20	3 8	1 10
Davenport, Iowa.....	15 0	9	3 7	17, 18	2 5	1 2
Keokuk, Iowa.....	14 6	29	5 0	20	2 7	2 5
Saint Louis, Missouri.....	30 0	1	17 2	24	9 6	7 8
Cairo, Illinois.....	40 0	4	19 0	28	8 10	10 2
Memphis, Tennessee.....	34 0	5, 6, 7	13 5	31	5 1	8 4
Vicksburg, Mississippi.....	41 0	9 to 12	18 8	31	9 1	9 7
New Orleans, Louisiana.....	—2 6	1	— 8 8	29, 30, 31	—12 7	3 11
<i>Ohio:</i>						
Pittsburg, Pennsylvania.....	20 0	1	5 4	21, 28, 29	0 5	4 11
Cincinnati, Ohio.....	50 0	6	12 10	26, 27	4 5	8 5
Louisville, Kentucky.....	24 0	7	6 0	27	3 0	3 0
<i>Cumberland:</i>						
Nashville, Tennessee.....	42 0	5	7 4	28, 29	1 1	6 3
<i>Tennessee:</i>						
Chattanooga, Tennessee.....	33 0	2	9 10	28, 29	1 10	8 0
<i>Mountain:</i>						
Pittsburg, Pennsylvania.....	29 0	1	5 4	21, 28, 29	0 5	4 11
<i>Savannah:</i>						
Augusta, Georgia.....		12	8 9	20	5 5	3 4
<i>Willamette:</i>						
Portland, Oregon.....		7	7 8	31	3 8	4 0
<i>Sacramento:</i>						
Red Bluff, California.....		1 to 4	1 2	30, 31	0 10	0 4
Sacramento, California.....		1	11 6	31	5 7	2 11
<i>Mobile:</i>						
Mobile, Alabama.....		19	18 0	14	15 10	2 2
<i>Colorado:</i>						
Yuma, Arizona.....						

† Below bench mark.

* Below high-water mark of 1874 and 1883.

FLOODS.

Eureka, Eureka county, Nevada: a destructive flood occurred at this place on the 7th. The water came from Ruby Hill and entered Adams Hill cañon. When the stream reached the Williamsburg mine it was thirty feet wide and seven feet deep. The Titus mine was filled with water and one man drowned.

Puerto de Luna, San Miguel county, New Mexico: the Rio Pecos river reached a high stage during the latter part of the month. The highest point was attained on the afternoon of the 24th, when the water was only a few inches below the flood marks of 1880. Much damage was done to the dams and irrigating ditches; and the crops on the bottom lands were entirely destroyed. One man and a number of animals were drowned near Puerto de Luna.

HIGH TIDES.

New River Inlet, North Carolina: daily from 5th to 15th.

LOW TIDES.

The following note is taken from the "New York Journal of Commerce," of August 12, 1884:

Biloxi, Mississippi, August 6th: the extraordinary continuance of low tides operates greatly to delay the passage over the bar of vessels of deep draft.

Low tides were also reported from the following stations:

Eastport, Maine, 2d.

Indianola, Texas, 2d.

WATER TEMPERATURE.

The following table gives the normal temperature of water at surface; the highest and lowest temperatures of the water at the several stations; the range of water temperature; the mean temperature of the air at the station; and the depth of water at which the observations are taken:

Temperature of water for August, 1884.

Station.	Normal temperature of water at surface.	Temperature at bottom.		Range.	Average depth, feet and inches.	Mean temperature of the air at station.
		Max.	Min.			
Atlantic City, New Jersey	71.4	73.9	72.4	3.5	2 9	71.5
Alpena, Michigan	69.9	72.8	63.5	9.3	12 3	62.0
Augusta, Georgia	84.2	86.7	80.0	6.7	6 7	79.1
Baltimore, Maryland	78.0	79.7	76.1	3.6	9 10	75.2
Block Island, Rhode Island	66.9	69.0	63.2	5.8	7 10	67.4
Boston, Massachusetts	64.3	68.5	62.5	6.0	20 10	68.3
Buffalo, New York	71.3	73.6	68.4	5.2	9 7	67.5
Canby, Fort, Washington Territory ..	65.6	67.1	58.5	8.6	15 9	60.7
Cedar Keys, Florida	86.5	87.2	83.4	3.8	10 11	81.2
Charleston, South Carolina	83.4	84.3	78.5	5.8	41 6	78.9
Chicago, Illinois	69.3	73.2	60.4	12.8	8 3	68.8
Chincoteague, Virginia	77.7	83.6	69.0	14.6	4 2	73.3
Cleveland, Ohio	72.8	76.1	69.2	6.9	14 0	68.2
Detroit, Michigan	71.2	75.0	66.6	8.4	23 0	69.4
Delaware Breakwater, Delaware	72.3	76.7	67.4	9.3	9 1	72.6
Duluth, Minnesota	61.9	70.2	53.3	16.9	9 11	63.7
Eastport, Maine	49.9	51.0	48.6	2.4	14 9	61.0
Escanaba, Michigan	65.2	70.2	57.0	13.2	18 3	62.7
Galveston, Texas	84.3	88.0	83.3	4.7	12 1	83.8
Grand Haven, Michigan	71.9	77.2	66.1	11.1	19 0	65.7
Indianola, Texas	86.5	87.6	84.1	3.5	8 11	81.9
Jacksonville, Florida	86.4	87.8	84.0	3.8	18 0	79.8
Key West, Florida	87.3	89.1	85.1	4.0	16 9	83.9
Mackinaw City, Michigan	70.6	72.6	59.0	13.6	10 0	62.2
Macon, Fort, North Carolina	79.8	81.5	76.0	5.5	9 0	76.6
Marquette, Michigan	60.3	62.8	51.6	11.2	10 0	63.0
Milwaukee, Wisconsin	64.3	70.8	48.1	22.7	8 0	64.8
Mobile, Alabama	85.1	86.0	80.0	6.0	16 11	78.7
New Haven, Connecticut	73.0	77.0	68.0	9.0	15 6	69.1
New London, Connecticut	71.6	70.3	64.0	6.3	12 10	68.5
New York City	72.8	74.3	70.2	4.1	16 3	71.5
Norfolk, Virginia	80.0	81.6	73.6	7.8	16 7	76.0
Pensacola, Florida	84.9	87.3	80.1	7.2	17 4	80.2
Portland, Maine	60.8	63.0	56.3	7.3	16 7	67.5
Portland, Oregon	68.8	75.2	72.2	3.0	55 11	68.0
Sandusky, Ohio	74.1	77.0	68.0	9.0	10 9	70.4
Sandy Hook, New Jersey	72.1	76.3	68.4	7.9	1 3	71.7
San Francisco, California	60.4	63.0	56.3	3.7	38 7	58.7
Savannah, Georgia	83.7	85.6	79.8	5.8	10 0	78.7
Smithville, North Carolina	82.3	83.0	77.0	6.0	10 10	77.1
Toledo, Ohio	74.8	77.1	69.2	7.9	11 8	70.0
Wilmington, North Carolina	81.3	82.3	74.5	7.8	20 8	79.9

* Record for 27 days.

† For 1 year only.

‡ Record for 2 years only.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for August, 1884, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 83.40 per cent. The percentages for the four elements are: Weather, 89.12; direction of the wind, 80.22; temperature, 80.61; barometer, 82.47 per cent. By geographical districts, they are: For New England, 84.12; middle Atlantic states, 83.47; south Atlantic states, 85.71; eastern Gulf states, 85.33; western Gulf states, 84.15; lower lake region, 82.76; upper lake region, 82.18; Ohio valley and Tennessee, 82.32; upper Mississippi valley, 85.36; Missouri valley, 76.75; north Pacific coast region, 83.87; middle Pacific coast region, 100.0; south Pacific coast region, 100.0. There were eleven omissions to predict out of 3,191, or 0.34 per cent. Of the 3,180 predictions that have been made, eighty or, 2.51 per cent., are considered to have entirely failed; one hundred and forty-six, or 4.59 per cent., were one-fourth verified; three hundred and sixty-seven, or 11.54 per cent., were one-half verified; six hundred and nineteen, or 19.47 per cent., were three-fourths verified; 1,968, or 61.89 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During August, 1884, fifty-nine cautionary signals were ordered. Of these, twenty-eight, or 47.46 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. No off-shore signals were ordered. The above number does not include signals ordered at display stations where the velocity of the wind is only estimated.

During the month there were seventy-four occurrences of velocities of twenty-five miles per hour or more without signal displays. Of this number there were five cases in which the signal displays were late and one in which the signal was lowered too soon. The following is a record of these occurrences, giving for each date the stations, direction, velocity and duration of gale when reported:

August 1st: Indianola, 29 miles; Fort Macon, nw., 42, 2½ hours.

August 3d: Kitty Hawk, sw., 25, ¼ hour; Detroit, sw., 25, 2 hours, signal order late.

August 4th: Barnegat, sw., 28; Little Egg Harbor, s., high; Sandy Hook, 26; Cape May, s. 26, 10 hours; Delaware Breakwater, sw., 32; Fort Macon, sw., 28, 11 hours; Smithville, sw., 26, squall; New Orleans, nw., 34, squall.

August 5th: Block Island, sw., 26; Kitty Hawk, w. 26, squall; Fort Macon, sw., 30, squall.

August 6th: Duluth, n., 26, signal late; Grand Haven, w., 28.

August 7th: Cape Henry, n., 28, signal late; Chincoteague, n., 27, signal late; Delaware Breakwater, ne., 30, signal late; Sandusky, n., 30, 3 hours.

August 11th: Kitty Hawk, ne., 31, 4 hours.

August 12th: Delaware Breakwater, 26; Cape Henry, ne., 28, 17 hours; Kitty Hawk, ne., 36, 9 hours; Fort Macon, ne., 27, 1 hour.

August 13th: Block Island, ne., 32; Point Judith, ne., high; Kitty Hawk, ne., 35, 23 hours.

August 14th: Kitty Hawk, ne., 31, 12 hours.

August 15th: Fort Macon, ne., 26, 1 hour.

August 17th: Kitty Hawk, ne., 25, 1 hour.

August 18th: Duluth, ne., 28; Grand Haven, s. 32; Milwaukee, sw., 28, 2 hours.

August 19th: Key West, ne., 31, squalls, the "Alice Vane" lost her foretopmast; Grand Haven, s., 32, vessel dismasted in squall, damage \$1,100.

August 20th: Milwaukee, sw., 32, 7 hours.

August 21st: Cape May, s., 30, 6 hours; Kitty Hawk, sw., 27, 2 hours.

August 22d: Block Island, sw., 26; Sandy Hook, w., 34; Delaware Breakwater, s., 53, squalls; Cape May, s., 52, squalls.

August 23d: Grand Haven, nw., 27; Buffalo, sw., 36, squalls, lake very rough; Rochester, w., 28, 4 hours.

August 24th: Eastport, nw., 26, twenty minutes; Kitty Hawk, e., 29; Cape Henry, ne., 27, at night; Sandusky, n., 26, forty-five minutes; Sandy Hook, n., 30; Thatcher's Island, n., 31, ½ hour.

August 25th: Oswego, sw., 26, 20 hours, schooner "Belle" sunk; Fort Macon, ne., 27, 1 hour; Thatcher's Island, nw., 29, 3 hours; Kitty Hawk, e., 29; Grand Haven, s., 28; Escanaba, s., 28, ½ hour; s., 33, 4 hours; s., 30, 1½ hours; this was a local storm but did some damage.

August 26th: Buffalo, sw., 26, 18 hours; Thatcher's Island, se., 32, 6 hours.

August 27th: Marquette, se., 26.

August 28th: Buffalo, 26, squall.

August 26th: Rochester, s., 26, ½ hour; Buffalo, sw., 28, 1 hour; Kitty Hawk, s., 27, 4½ hours.

August 30th: Chincoteague, nw., 36, signal late; Delaware Breakwater, 31, signal lowered early; Kitty Hawk, nw., 26, 4½ hours; Fort Macon, sw., 27, 8 hours; Sandy Hook, nw., 40, squall; New York, e., 32, squall; Indianola, 30, light "norther"; Rochester, w., 27, 1 hour; Buffalo, sw., 35, squall.

August 31st: Fort Macon, sw., 34, 1 hour; Indianola, 31, light "norther."

Summary of meteorological data for stations of the Signal Service, August, 1884.

Stations.	Elevation above sea level.	Mean barometer corrected for temperature and error.	Departure from normal.	Monthly mean.	Maximum.	Date.	Minimum.	Date.	Prevailing direction.	Max. velocity.	Direction.	Date.	Total movement.	Rainfall.
<i>New England states.</i>														
Block Island	27	30.03	+0.03	67	—	78	15.54	25	sw.	32	ne.	13	7.452	6.41
Boston	142	29.90	+0.03	68	—	94	18.51	25	sw.	24	nw.	24	5.722	5.01
Eastport	61	29.96	+0.06	61	—	86	18.46	25	sw.	20	nw.	24	3.133	4.41
Mount Washington	6,279	23.96	+0.04	45	—	65	19.22	25	w.	88	se.	29	29.870	8.63
New Haven	107	29.94	+0.02	69	—	90	20.40	25	sw.	21	n.	15	3.957	5.60
New London	47	30.03	+0.03	68	—	86	20.48	25	sw.	22	n.	26	3.796	7.13
Portland	45	29.98	+0.04	68	—	88	15.53	25	sw.	22	sw.	29	5.103	3.98
<i>Middle Atlantic states.</i>														
Albany	75	29.96	+0.02	73	—	92	18.50	25	sw.	20	sw.	4	3.449	5.27
Atlantic City	13	30.03	+0.03	72	—	89	20.61	8	ne.	27	sw.	29	5.808	4.04
Baltimore	45	30.02	+0.01	75	—	94	20.59	25	sw.	17	nw.	30	3.237	1.74
Barnegat	22	30.03	+0.01	71	—	86	20.61	11	sw.	32	sw.	29	8.391	5.04
Cape Henry	16	30.04	+0.02	75	—	92	21.65	15	ne.	28	n. ne.	...	8.395	2.56
Cape May	27	30.02	+0.01	73	—	86	19.57	25	sw.	52	n.	22	5.180	5.30
Chincoteague	8	30.04	+0.02	73	—	91	20.61	13	sw.	36	nw.	30	5.735	1.10
Delaware Breakwater	20	30.03	+0.01	73	—	92	20.66	13	ne.	35	sw.	22	9.192	4.19
Lynchburg	652	29.98	+0.01	75	—	92	20.58	14	ne.	17	nw.	21	1.890	2.85
New York	164	29.89	+0.01	72	—	92	20.56	25	sw.	32	e.	30	5.352	8.56
Norfolk	30	30.03	+0.02	76	—	92	20.65	14	ne.	22	n.	21	4.715	2.95
Philadelphia	117	29.94	+0.01	72	—	95	20.54	25	sw.	24	sw.	4	5.041	4.30
Sandy Hook	28	30.03	+0.02	72	—	91	20.59	25	sw.	40	nw.	30	8.032	5.12
Washington	106	29.96	+0.01	74	—	95	20.57	25	sw.	28	w.	21	3.107	1.01
<i>South Atlantic states.</i>														
Atlanta	1,129	28.92	+0.03	75	—	89	27.66	6	e.	35	n.	3	4.939	2.66
Augusta	183	29.88	+0.01	79	—	94	21.64	14	ne.	18	e. ne.	...	2.218	4.36
Charleston	52	29.98	+0.02	79	—	91	1.68	13	ne.	21	sw.	2	4.505	6.12
Charlotte	808	29.22	+0.02	75	—	92	20.58	14	ne.	14	n. e.	...	3.313	2.06
Fort Macon	12	30.03	+0.02	76	—	85	27.69	15	ne.	26	w.	1	7.462	5.89
Hatteras	43	29.99	+0.00	80	—	94	21.70	24	ne.	24	w.	2	3.451	5.21
Jacksonville	22	30.04	+0.00	76	—	93	30.68	14	ne.	36	ne.	12	10.441	6.58
Kitty Hawk	87	29.95	+0.00	79	—	92	4.69	12	n. e.	24	sw.	23	3.225	8.41
Savannah	34	30.00	+0.01	77	—	88	1.65	14	ne.	26	sw.	4	6.795	5.38
Smithville	52	29.99	+0.01	77	—	90	30.63	15	ne.	19	sw.	29	3.432	9.58
Wilmington	35	30.01	+0.04	79	—	96	29.63	7	nw.	23	ne.	16	4.188	1.26
Mobile	219	29.81	+0.01	78	—	97	29.62	6	ne.	27	ne.	4	2.829	3.05
Montgomery	52	29.96	+0.01	82	—	93	29.66	8	e.	34	nw.	4	4.372	0.87
New Orleans	30	30.00	+0.01	80	—	94	28.66	7	sw.	24	nw.	3	4.385	2.07
Pensacola	244	29.81	+0.04	79	—	98	29.62	11	n.	17	nw.	4	3.945	2.10
Vicksburg	451	29.56	+0.00	76	—	104	28.58	11	e.	24	n.	22	2.720	3.73
Fort Smith	40	29.98	+0.02	84	—	93	30.71	6	ne.	21	ne.	31	6.577	1.77
Galveston	26	29.97	+0.01	82	—	96	30.72	6	ne.	52	ne.	30	6.610	1.28
Indianola	299	29.72	+0.00	78	—	99	28.59	6	ne.	20	n.	30	2.533	3.26
Little Rock	533	29.49	+0.02	80	—	92	29.62	12	sw.	26	a.	1	5.880	0.66
Palestine	227	29.80	+0.03	81	—	104	29.64	12	n.	32	w.	1	3.251	1.99
Shreveport	753	29.25	+0.00	74	—	92	27.61	6	nw.	24	nw.	3	2.798	2.54
Ohio valley & Tennessee.	620	29.41	+0.01	75	—	92	17.59	9	w.	18	sw.	3	3.165	2.05
Chattanooga	805	29.20	+0.00	73	—	90	30.51	11	sw.	29	sw.	3	3.612	0.70
Cincinnati	753	29.25	+0.02	72	—	89	16.50	9	n. sw.	17	nw.	4	3.357	0.46
Columbus	980	29.06	+0.01	73	—	93	27.57	6	ne.	28	n.	22	2.803	4.75
Indianapolis	530	29.48	+0.03	75	—	92	29.57	10	sw.	23	w.	21	3.780	4.81
Knoxville	321	29.73	+0.04	78	—	97	29.62	11	nw.	19	nw.	...	3.567	1.27
Louisville	549	29.48	+0.04	75	—	94	29.50	6	ne.	38	nw.	29	3.100	2.81
Memphis	766	29.24	+0.01	72	—	90	20.52	11	nw.	23	a.	21	3.444	2.94
Nashville	690	29.28	+0.01	68	—	88	16.46	25	sw.	36	sw.	23	6.180	4.56
Pittsburgh	690	29.31	+0.01	68	—	89	3.50	11	n.	24	a.	3	5.572	1.65
Buffalo	661	29.33	+0.01	69	—	91	3.46	9	sw.	25	sw.	3	5.699	1.55
Cleveland	681	29.31	+0.00	69	—	91	19.51	25	sw.	24	w.	30	5.852	2.16
Detroit	334	29.66	+0.04	67	—	92	17.47	8	ne.	25	sw.	3	5.634	1.71
Erie	633	29.32	+0.02	67	—	92	20.42	25	sw.	28	sw.	23	6.073	2.52
Geneseo	621	29.37	+0.03	67	—	93	20.54	5	sw.	30	n.	7	7.588	2.48
Port Huron	639	29.35	+0.01	70	—	92	17.45	9	sw.	24	a. sw.	5	4.754	1.48
Rochester	670	29.33	+0.01	70	—	92	17.45	9	sw.	24	a. sw.	5	4.754	1.48
Sandusky	690	29.28	+0.01	68	—	88	16.46	25	sw.	36	sw.	23	6.180	4.56
Toledo	690	29.31	+0.01	68	—	89	3.50	11	n.	24	a.	3	5.572	1.65
Upper lakes.	661	29.33	+0.01	69	—	91	3.46	9	sw.	25	sw.	3	5.699	1.55
Alpena	687	29.22	+0.07	64	—	82	13.48	23	ne.	36	a.	2	5.792	4.71
Chicago	613	29.30	+0.00	63	—	81	14.40	8	sw.	32	a.	18	7.045	2.30
Duluth	620	29.36	+0.00	60	—	83	17.45	10	nw.	25	w.	3	6.000	3.28
Escanaba	695	29.34	+0.04	62	—	80	20.42	8	nw.	26	sw.	...	5.804	5.46
Grand Haven	673	29.25	+0.05	63	—	82	20.39	8	nw.	32	w.	20	6.759	1.84
Mackinaw City	697	29.27	+0.01	66	—	83	20.48	8	sw.	32	w.	20	6.759	1.84
Marquette	697	29.27	+0.01	66	—	83	20.48	8	sw.	32	w.	20	6.759	1.84
Milwaukee	377	29.68	+0.02	75	—	93	28.57	10	n.	32	nw.	25	4.112	2.74
Upper Mississippi valley.	615	29.35	+0.01	70	—	88	19.44	8	nw.	24	a.	2	5.472	3.84
Chitau	849	29.14	+0.01	69	—	95	19.49	9	sw.	20	w. n.	...	3.578	3.84
Davenport	665	29.31	+0.00	68	—	84	19.49	8	sw.	18	sw.	29	3.278	4.25
Des Moines	618	29.35	+0.02	72	—	84	19.49	8	sw.	29	sw.	25	5.111	2.74
Dubuque	725	29.22	+0.01	69	—	86	15.52	4	sw.	28	a.	24	5.166	3.82
Keokuk	943	28.94	+0.04	64	—	88	11.42	21	sw.	34	n.	20	7.368	6.17
La Crosse	483	29.45	+0.03	74	—	93	19.54	9	sw.	36	nw.	29	7.411	1.21
Moorhead	801	29.11	+0.02	69	—	90	15.50	4	sw.	40	sw.	19	6.190	2.89
Saint Louis	644	29.38	+0.02	72	—	91	19.49	9	sw.	24	nw.	3	5.031	1.54
Saint Paul	1,510	28.38	+0.04	70	—	93	27.45	4	sw.	35	nw.	2	6.996	0.74
Springfield	1,305	28.59	+0.01	66	—	89	28.43	21	sw.	33	nw.	3	7.030	1.18
Upper Missouri valley.	842	29.14	+0.00	72	—	95	28.50	10	sw.	18	sw.	24	4.187	4.65
Fort Bennett	1,113	28.86	+0.01	70	—	88	19.53	21	sw.	27	sw.	...	5.644	7.07
Huron	1,228	28.70	+0.00	69	—	90	28.48	8	sw.	28	sw.	...	3.113	2.61
Leavenworth	1,113	28.86	+0.01	70	—	88	19.53	21	sw.	27	sw.	...	5.644	7.07
Omaha	1,228	28.70	+0.00	69	—	90	28.48	8	sw.	28	sw.	...	3.113	2.61
Yankton	1,228	28.70	+0.00	69	—	90	28.48	8	sw.	28	sw.	...	3.113	2.61

Summary of meteorological data for stations of the Signal Service, August, 1884.—Continued.

Stations.	Elevation above sea-level.	Mean barometer corrected for temperature and error.	Departure from normal.	Monthly mean.	Departure from normal.	Maximum.	Date.	Minimum.	Date.	Prevailing direction.	Max. velocity.	Direction.	Date.	Total movement.	Rainfall.
Extreme northwest.															
Bismarck	1,694	28.15	+0.02	66	—	91	15.42	7 s.			30 n.		15	5,858	3.80
Fort Buford	1,930	27.92	+0.07	66	—	100	14.44	3 n.w.			44 n.w.		1	6,269	1.06
Saint Vincent	804	29.03	+0.06	62	—	89	27.39	23 n.w.			42 s.w.		24	6,354	7.18
Pacific coast district.															
Cape Mendocino	637	29.29	.....	57	.....	89	26.47	1 n.			52 se.		2	16,448	0.33
Los Angeles	371	29.55	+0.01	71	+2	102	29.52	28 w.			20 w.		...	3,695	0.02
Olympia	36	29.95	+0.06	65	+5	92	3.47	16 n.			10 s.w.		...	1,225	0.96
Portland	67	29.91	+0.06	68	+2	94	2.51	28 n.			16 ne.		2	3,258	0.33
Red Bluff	332	29.53	+0.01	82	+2	107	10.55	17 s.			20 s.		4	3,492	Inap.
Roseburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sacramento	64	29.82	.....	72	0	100	10.54	18 w.			18 s.w.		16	5,234	Inap.
San Diego	67	29.84	+0.01	70	+1	93	15.54	19 w.			20 n.w.; w.		4	3,367	Inap.
San Francisco	60	29.88	+0.01	59	+1	75	6.52	22 s.w.			33 w.		29	8,351	0.04
Northern slope.															
Assinaboine	2,720	27.16	.00	65	—	93	10.42	19 n.w.			48 se.		27	5,542	2.61
Cheyenne	6,105	24.14	.....	61	—	86	31.40	30 n.			36 n.w.		1	6,741	2.07
Deadwood	4,600	25.46	+0.02	61	—	83	14.40	20 ne.			15 ne.		5	2,163	3.07
Fort Benton	2,681	27.22	+0.06	69	+1	99	26.36	30 ne.			40 w.		1	4,742	0.79
Fort Custer	3,040	26.85	.....	63	—	100	14.43	2 s.e.			52 n.w.		15	4,750	2.00
Fort Maginnis	4,340	25.64	+0.02	61	.....	89	10.36	30 s.w.			48 n.w.		1	6,740	1.33
Fort Shaw	3,550	.....	.....	64	—	92	10.36	20 s.w.			36 n.w.		1	4,658	0.59
Helena	4,044	25.88	.00	67	0	88	26.42	20 w.			22 w.		1	4,635	0.47
Poplar River	.....	.....	.....	66	.....	100	14.43	3 w.			.....		24	.....	0.68
Spokane Falls	1,905	27.94	+0.03	70	+5	98	5.44	17 s.w.			16 s.w.		...	2,895	0.54
Middle slope															
Denver	5,294	24.45	+0.02	68	—	92	1.51	3 s.e.			28 w.		1	4,475	1.71
Dodge City	2,517	27.48	+0.01	72	—	94	28.55	4 s.e.			42 se.		1	8,774	4.82
Fort Elliott	2,650	27.29	+0.01	74	0	101	2.54	30 ne.			40 w.		24	7,024	5.60
North Platte	2,841	27.12	+0.01	68	—	92	28.48	30 s.e.			36 ne.		1	6,535	2.13
Pike's Peak	14,134	18.09	+0.02	36	—	48	1.23	20 w.			52 w.		20	9,113	0.25
West Las Animas	3,899	26.07	.....	70	—	101	1.52	31 e.			31 e.		7	5,323	2.17
Southern slope.															
Fort Concho	1,900	28.09	.00	81	+2	103	1.60	31 s.			32 ne.		19	6,170	1.20
Fort Davis	4,928	25.25	.....	73	+2	100	2.58	20 s.w.			24 s.		18	3,794	6.70
Fort Sill	1,200	28.76	+0.01	79	+1	102	2.58	5 se.			32 ne.		1	7,101	1.21
Fort Stockton	3,070	27.01	+0.01	79	+1	105	2.62	31 se.			31 se.		2	7,146	2.7
Northern plateau.															
Boise City	2,750	27.15	+0.02	74	+1	95	30.52	29 n.w.			20 n.w.		18	2,839	0.07
Dayton	1,667	28.24	+0.02	70	+3	102	5.42	16 s.w.			16 s.w.		4	4,320	0.09
Lewistown	708	29.13	.00	74	+2	101	5.48	19 ne.			20 n.w.		30	987	0.66
Middle plateau.															
Salt Lake City	4,348	25.66	+0.02	73	—	92	4.49	21 n.w.			36 s.w.		16	3,492	0.73
Southern plateau.															
Camp Thomas	2,710	27.19	+0.01	81	+1	106	5.54	19 e.; w.			.....		.....	.....	2.04
El Paso	2,764	26.27	+0.01	80	+1	110	1.63	26 s.			23 n.		6	1,474	3.98
Fort Apache	5,050	25.05	+0.02	68	+1	97	4.42	21 e.			32 n.w.		6	3,819	5.89
Fort Grant	4,856	25.26	+0.03	76	+1	97	5.58	24 n.			38 s.		18	3,828	2.41
Prescott	5,389	24.80	+0.02	68	—	92	1.41	19 s.			34 s.		18	3,393	1.57
Yuma	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rio Grande valley.															
Brownsville	59	29.92	+0.01	81	—	95	12.68	9 s.e.			25 se.		19	4,884	0.88
Rio Grande City	230	29.78	+0.04	83	0	105	6.66	9 s.e.			25 se.		27	5,392	.....
Florida peninsula.															
Cedar Keys	22	30.00	+0.01	81	—	92	3.70	5 n.e.			25 s.w.		30	5,262	8.11
Key West	20	29.98	+0.01	84	0	95	1.72	20 e.			31 ne.		19	5,366	3.16
Sanford	36	29.94	+0.01	80	.....	97	1.70	31 s.e.			26 ne.		26	20,329	11.06

Mount Forest, Ontario, Canada, 19th.

Poplar River, Montana, 20th: an auroral arch, with streamers reaching an altitude of 45° , was visible from 11 to 11.45 p. m.

Vevay, Indiana, 20th: a faint aurora, of crimson color, first appeared in the northwest at 8 p. m.; at 8.30 p. m. it passed to northeast. Diffuse flashes of white light issued from the north and extended to an altitude of 25° .

Cresco, Iowa, 20th: faint auroral beams were observed in the north at 9 p. m.

Fort Totten, Dakota, 21st: an auroral arch was visible in the north from 9.50 p. m. until midnight; altitude 25° , azimuth, 100° .

Mount Forest, Ontario, Canada, 21st.

Fort Yates, Dakota, 23d: a faint auroral display was observed at 11 p. m.

Vevay, Indiana, 23d.

THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various districts on the following dates:

New England.—1st, 2d, 4th, 5th, 6th, 9th, 11th to 15th, 17th to 24th, 26th to 31st.

Middle Atlantic states.—1st to 5th, 7th to 10th, 13th, 14th, 18th to 23d, 25th to 31st.

South Atlantic states.—1st to 12th, 15th, 16th, 20th to 31st.

Florida peninsula.—1st to 31st.

Eastern Gulf states.—1st to 4th, 8th to 11th, 17th to 27th, 29th, 30th, 31st.

Western Gulf states.—1st, 3d to 7th, 9th to 30th.

Rio Grande valley.—3d to 7th, 10th, 14th, 15th, 18th, 21st, 22d, 23d, 30th.

Tennessee.—2d, 3d, 4th, 6th, 7th, 8th, 11th, 13th, 14th, 20th to 23d, 25th, 28th, 29th, 30th.

Ohio valley.—3d, 4th, 5th, 7th, 9th, 10th, 16th, 17th, 20th to 23d, 25th, 26th, 28th, 29th, 30th.

Lower lake region.—3d, 4th, 6th, 7th, 8th, 10th to 14th, 17th to 23d, 25th, 26th, 28th to 31st.

Upper lake region.—2d, 3d, 4th, 6th, 10th, 11th, 14th, 16th to 25th, 27th to 30th.

Extreme northwest.—1st, 2d, 5th, 12th to 19th, 22d, 24th, 27th, 28th, 31st.

Upper Mississippi valley.—1st, 2d, 3d, 5th, 6th, 10th, 14th, 16th to 25th, 27th, 28th, 29th.

Missouri valley.—1st to 5th, 7th, 11th to 22d, 24th to 28th.

Northern slope.—6th, 11th to 22d, 26th, 28th, 31st.

Middle slope.—1st to 7th, 10th to 24th, 26th to 29th.

Southern slope.—6th, 7th, 10th, 14th, 17th to 21st, 24th, 25th, 26th, 30th.

Southern plateau.—1st to 31st.

Middle plateau.—2d, 3d, 4th, 8th to 11th, 15th to 19th, 21st.

Northern plateau.—5th, 11th, 12th, 13th, 17th, 26th.

North Pacific coast region.—2d to 6th, 11th, 23d.

Middle Pacific coast region.—Salinas City, 3d; Red Bluff, 9th, 10th; Princeton, 9th, 10th, 11th; Hydesville, 11th.

South Pacific coast region.—Los Angeles, 3d; Cahuenga valley (near Los Angeles), and Poway, 3d, 21st, 22d; San Diego, 15th, 21st, 22d.

Professor H. A. Hazen, of the Signal Service, has prepared the following notes on thunder-storms for August, 1884:

Reports of special voluntary observers from north of 35° N. lat., and east of 102° W. of Greenwich:

The total number of reports filed up to September 18 this 2,226. Of these, the largest number were of storms on August 21st, 256; 22d, 183; 30th, 150; 4th, 194; 29th, 126; 20th, 104; 28th, 72.

The following general résumé is given, considering only the time of beginning of thunder:

On 2d, action was general in Minnesota, Wisconsin, Iowa, and Illinois. At 3 p. m., Washington time, storms prevailed in southeast of storm-centre and at a mean distance of 380 miles. At 11 p. m. they were south-southeast at a distance of 440 miles. On the morning of the 3d general action prevailed to the south of "low" at a mean distance of 600 miles. On the 4th general action is noted in Pennsylvania, New Jersey, Maryland, and Virginia, at a distance of 510 miles. In this instance the storms were very

numerous, beginning at 1 p. m., only two records having been received before that hour; there seems also to have been rather of an abrupt break at 7 p. m., there being only one record, and that in South Carolina, after that hour. On the 20th general action took place in Wisconsin, Illinois, Indiana, Iowa, and Missouri, to the south of "low" at a distance of 450 miles. Records begin at noon and end, as in the last case, at 7 p. m. Only one observation was recorded after 8 p. m., and that was in Arkansas.

On the 21st action was very general throughout the Ohio valley and middle Atlantic states. These storms began at 11 a. m., and continued up to 7 p. m. Mean distance from "low" of the storms in the former region was 660 miles to south-southwest, and in the latter region 470 miles to south.

On the 22d general action occurred, south and southwest of "low," and at a distance of 540 miles.

On the 28th general action is found at 7 a. m., and about 350 miles to southeast of "low."

On the 29th there were two distinct periods of general action; the first at 7 a. m., 550 miles south of "low," and the other about twelve hours later to the south and southwest of "low," distant 500 miles.

On the 30th general action is noted from 5 to 8 p. m. in the middle Atlantic states at a mean distance from "low" of 600 miles, and a mean direction of south.

The mean direction of 900 storms in this month was a very little west of south, and the mean distance from "low" was 515 miles.

ELECTRICAL PHENOMENA.

On the summit of Pike's Peak, on the 15th, the telegraph wires and other metallic objects produced a singular noise, being due to atmospheric electricity.

The observer at Fort Craig, New Mexico, reports the following: "A curious phenomenon was witnessed on the 17th, beginning half an hour before sunset and lasting one hour thereafter. A bright luminous arch, 1° in width and about 140° in length, was observed on the western horizon. During the time above mentioned the clouds were highly charged with electricity, and it was raining hard between the observer and the setting sun."

Mount Washington, New Hampshire: at 7.25 p. m. on the 26th the telegraph instruments were damaged, and the observer was severely stunned. As only distant lightning was observed previous to that time, the "cutting out" of the instruments, as is usually done during thunder storms, was not considered necessary.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various districts on the following dates:

New England.—12th, 18th, 20th.

Middle Atlantic states.—1st, 4th, 6th, 12th, 16th, 17th, 21st, 23d, 24th, 25th, 27th, 28th.

South Atlantic states.—6th, 15th, 17th, 21st, 27th, 28th, 30th.

Florida peninsula.—6th, 10th to 13th.

Eastern Gulf states.—3d, 6th, 7th, 8th, 10th, 24th.

Western Gulf states.—3d, 9th to 13th, 16th, 18th, 19th, 22d, 23d, 24th.

Tennessee.—6th, 21st, 22d, 25th, 27th, 28th, 29th.

Ohio valley.—3d, 5th, 6th, 12th, 15th.

Lower lake region.—1st, 3d, 24th, 25th, 27th, 28th.

Upper lake region.—24th, 27th.

Extreme northwest.—17th, 24th, 31st.

Upper Mississippi valley.—1st, 3d, 23d, 24th, 27th, 29th.

Missouri valley.—5th, 23d, 27th.

Middle slope.—9th, 10th, 15th, 18th, 20th, 21st, 24th, 25th, 26th.

Southern plateau.—9th, 21st.

Middle plateau.—3d, 12th.

North Pacific coast region.—29th.

Middle Pacific coast region.—1st, 6th, 13th.

LUNAR HALOS.

Lunar halos were observed in the various districts on the following dates:

New England.—1st, 3d, 28th.

Middle Atlantic states.—1st to 7th, 22d, 26th, 28th, 29th.

South Atlantic states.—2d, 3d, 4th, 11th, 27th, 28th, 30th, 31st.

Florida peninsula.—1st, 7th, 8th, 9th, 31st.
Eastern Gulf states.—1st, 4th, 30th.
Western Gulf states.—5th, 6th, 8th, 10th.
Rio Grande valley.—9th, 27th.
Tennessee.—5th, 6th, 8th.
Ohio valley.—1st, 3d, 4th, 6th, 25th, 26th, 27th, 30th, 31st.
Lower lake region.—2d, 6th, 27th, 29th.
Upper lake region.—2d, 10th, 14th, 26th, 27th.
Extreme northwest.—11th, 30th.
Upper Mississippi valley.—9th, 29th.
Northern slope.—7th.
Middle slope.—8th, 9th.
Southern slope.—4th.
Southern plateau.—1st, 4th, 27th.
North Pacific coast region.—3d.
Middle Pacific coast region.—1st, 28th.

MIRAGE.

Block Island, Rhode Island: on the 15th, the coast of the mainland appeared as perpendicular cliffs rising to an apparent height of seventy feet, and vessels were observed with their images, about forty feet above them, in upright positions.

Huron, Dakota: at sunrise on the 30th, a remarkably distinct mirage was observed, showing a clearly defined lake having shores dotted with farm houses, grain stacks, herds of cattle, etc. The phenomenon was a reflection of Lake Benton and the surrounding country, lying about forty miles east of Huron. The view both up and down the Dakota river was unobstructed for many miles, and presented a scene very rarely witnessed in this region.

Mirage was also observed at the following stations:

Yates Centre, Kansas, 8th.
 Salina, Kansas, 29th.
 Marquette, Nebraska, 4th, 28th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-two stations show 4,986 observations to have been made, of which four were reported doubtful; of the remainder, 4,982, there were 4,172, or 83.8 per cent., followed by the expected weather.

A peculiar appearance of the sky after sunset and before sunrise has been observed during the month of August, 1884. This phenomenon somewhat resembled that observed during the autumn of 1883, and the early winter months of 1884.

The following reports referring to this appearance have been received:

Alabama.—Professor P. H. Mell, Jr., director of the State Weather Service reports: "rosy sunsets were observed on clear days."

Arkansas.—Lead Hill, Boone county: sunset displays were observed on nearly every clear evening during the month, being especially bright on the 27th, 28th and 31st.

California.—Sacramento: a brilliant orange colored light covered the western horizon at sunset on the 31st.

San Francisco: the western sky was unusually red at sunset, and until 7.30 p. m. of the 31st.

Los Angeles: the western horizon presented a rosy red appearance after sunset on the 7th, 11th, and 15th. On the 26th and 27th, a bright red glow was observed after sunset.

Hydesville, Humboldt county: red skies after sunset were observed on the evenings of the 2d, 3d, 5th, and 31st; the display on the last-mentioned date being the most brilliant observed.

Colorado.—The observer on the summit of Pike's Peak reported red sunset on the 24th.

Dakota.—Webster, Day county: an unusually bright twilight

was observed on the 29th, lasting about forty-five minutes after sunset.

Huron, Beadle county: on the 4th the sky and sun had a blood red appearance, from the time the sun touched the horizon to thirty minutes afterwards.

Florida.—Archer, Alachua county: the sunrises on the 25th, 26th, and 27th, were as brilliant as the remarkable displays seen in December, 1883; the western sky at sunset on the 25th, 27th, and 29th, was also of unusual appearance.

Jacksonville: sky red at sunset on the 26th.

Georgia.—Forsyth, Monroe county: for thirty minutes before sunrise on the 29th, the eastern sky was of a deep vermilion color, surpassing in brilliancy any similar phenomenon seen at this place.

Atlanta: a red sky was observed at sunset on the 30th and 31st.

Illinois.—Swanwick, Perry county: the sunsets of the 30th and 31st were unusually bright.

Iowa.—Humboldt, Humboldt county: a beautiful sunset display was observed on the 22d.

Manchester, Delaware county: red sunsets were observed on the 4th, 5th, 22d, 25th, 29th, 30th, and 31st.

Muscataine, Muscatine county: brilliant red colors were observed in the eastern sky before sunrise on the 5th, 9th, 18th, 26th, and 30th; and the same phenomenon appeared in the west after sunset on the 5th, 9th, 10th, 18th, 25th, 29th, 30th, and 31st.

Kansas.—Manhattan, Riley county: twilights of unusual brilliancy and duration were noted on the evenings of the 29th and 30th.

Salina, Saline county: red sunsets, similar to those observed during the latter part of last year, appeared about the 20th.

Wellington, Sumner county: sunset afterglows were quite prominent on the evenings from the 27th to 31st; the colors were plainly defined and the duration of the displays was about one hour and forty-five minutes.

Kentucky.—Richmond, Madison county: red glows were observed in the western sky after sunset on the 5th, 18th, 29th, and 31st; the display on the last-named date was very bright and extended to the east.

Maine.—Portland: a peculiar, red sunset was observed on the 17th.

Massachusetts.—Somerset, Bristol county: at sunset of the 27th a red and orange colored glow covered the western horizon, paling toward the zenith; the display lasted forty-five minutes.

Michigan.—Manistique, Schoolcraft county: the sunset on the 26th was very brilliant, the colors being yellow near the horizon and red towards the zenith; the display continued for one hour after sunset. A bright yellow sunset was also observed on the 27th.

Minnesota.—Chester, Olmstead county: a beautiful twilight was observed on the evening of the 25th.

Saint Paul: from 7.50 to 9 p. m. of the 26th a segment of the southern sky for about 40° of the horizon and 20° altitude at the centre, was illuminated as though a great fire were raging in the distance. The red glow in the southeastern sky was also visible from 7.40 to 8.50 p. m. of the 27th, and from 7.55 to 9.10 p. m. of the 28th.

Montana.—Fort Assinaboine: the western sky was of a crimson color for thirty minutes after sunset on the 2d. The same appearance, lasting for twenty minutes, was observed after the sunsets of the 3d and 4th; and again for thirty minutes on the 7th.

Nebraska.—Red Willow, Red Willow county: a very brilliant sunset occurred on the 29th, the red glow extending to the eastern sky.

Yutan, Saunders county: the western sky at sunset on the 10th was of a brilliant red color; the same peculiarity was observed on the 29th, 30th, and 31st.

New Hampshire.—The observer on the summit of Mount Washington, reports that unusually brilliant sunsets of various colors were observed on the 7th, 12th, 17th, 18th, and 22d.

New Jersey.—Phillipsburg, Warren county: the sunsets of the 26th and 31st were quite red.

New Mexico.—Fort Craig: at sunset of the 29th the western horizon appeared covered with a reddish haze, resembling the red sunsets of last fall.

New York.—Le Roy, Genesee county: a red sunset was observed on the 31st.

Ohio.—The voluntary observer at Jacksonborough, Butler county, reports having observed brilliant sunrises and sunsets during the month, but does not specify the dates.

North Lewisburg, Champaign county: about the middle of the month the sky at sunrise and sunset was of a purple color.

Pennsylvania.—Fallsington, Bucks county: red skies were observed at sunset on the 23d and 26th.

Rhode Island.—Point Judith: a peculiar glow was observed in the western sky a few minutes after sunset on the 16th. Extending about 30° on each side of where the sun had set and to a height of 40°, the sky was of a delicate pink color; after lasting about thirty minutes the pink changed to red which remained visible for about twenty minutes. From 4 p. m. until sunset on the 26th, a portion of the western sky extending about 30° on each side of the sun, and from the horizon to a height of about 15°, was of dull reddish color. After sunset the colors changed to bright orange, pink, and afterwards to red. This display was one of the most remarkable that has been reported, being accompanied by streamers of red light similar to that of the aurora.

Tennessee.—Estill Springs, Franklin county: from 6.45 to 6.55 p. m. on the 8th a rose colored band, from 10° to 15° in width extended from the point on the horizon where the sun had set to a height of 45°. On the south side of this band were observed several narrower bands which were parallel with the first. The same phenomenon was witnessed on the evening of the 19th, being visible from 6.48 to 7.54 p. m., and brightest at 6.51 p. m.

Ashwood, Maury county: brilliant twilight colors, lasting until 8 p. m., were observed on the evenings of the 30th and 31st.

Knoxville: on the 11th the western sky was of a bright pink color for about thirty minutes after sunset. On the 15th the same phenomenon was observed, the color extending to about 45°.

Nashville: the remarkable sun glows which were observed during October, November, and December, 1883, reappeared during August, and were observed on the following dates: 1st, 2d, 4th, 5th, 6th, 12th, 13th, 21st, 27th, 30th, and 31st.

The following extract is taken from the August report of the "Tennessee Weather Service."

Red or yellow sunsets were observed as follows: At Grief, 28th, 31st, a beautiful and clear reddish glow for more than an hour after sunset; Parksville, 28th; Cookeville, 30th, 31st, pink color; Manchester, 18th, beautiful yellow; Hardison's Mills, 4th, 12th, 25th, red; Hurricane Switch, on nineteen days; Henderson, 29th and 30th, crimson and yellow; Trenton, 28th, 29th; Union City, 4th; Dyersburg, 21st, 28th, 31st; Woodstock, 30th, 31st.

Texas.—Galveston: red sunsets on the 27th and 29th, and red sunrises on the 30th and 31st.

Indianola: a peculiar redness of the sky was observed at sunset of the 26th.

Cleburne, Austin county: green sky and yellow streamers were observed at twilight on the 30th, and a red twilight was observed on the evening of the 31st.

Virginia.—Variety Mills, Nelson county: sunsets, similar to those observed last autumn, occurred on the 13th, 14th, 15th, 18th, 19th, 20th, 26th, and 31st.

The following extract is taken from "Knowledge," (a scientific journal, conducted by Professor Richard A. Proctor, and published in London, England), of August 15, 1884.

"Some gorgeous sunlight effects," says the *Standard*, "have been observed over the Yorkshire wolds for several nights past. The sky has been one mass of richly-blended colours, commencing at the horizon with a broad belt of deep yellow light, and then tier above tier of orange and purple, the latter colour predominating in horizontal streaks, whilst the sky above was flooded with a magnificent glow from the setting sun."

SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for August, 1884:

Date— Aug., 1884.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 1 p. m.	0	5½	0	0	0	0	3	35½	
3, 6 p. m.	1	5½	0	0	1	2	4	40½	
6, 8 a. m.	1	3	0	0	0	0	3	8	
8, 11 a. m.	2	8½	0	0	2	8½	5	20½	
11, 3 p. m.	0	0	0	0	0	0	2	25½	
15, 8 a. m.	0	0	0	0	0	0	2	25½	
17, 12 m.	1	5	0	5	1	5	3	25½	
18, 9 a. m.	0	0	0	10½	0	0	3	15½	
19, 7 a. m.	3	15½	0	5	1	3	6	25½	
23, 11 a. m.	1	30½	0	0	0	0	5	60½	Many of the spots small.
24, 9 a. m.	0	0	0	0	0	0	4	50½	Do.
26, 4 p. m.	2	20½	0	10½	2	5	6	60½	Do.
27, 12 m.	1	3	0	10½	0	0	7	50½	Do.
31, 11 a. m.	1	25½	0	0	0	0	3	40½	

Faculae were seen at the time of every observation. †Approximated.

Mr. William Dawson, of Spiceland, Henry county, Indiana, furnishes the following record of sun spots: 1st, 8 a. m., four groups, ninety-five spots, very large group west of centre; at 8.20 a. m. of same date there were observed five groups, one hundred and twenty spots, the large group west of the centre having seventy-five spots. 2d, 8 a. m., five groups, one hundred and twenty spots, very large group of seventy-five spots west of centre. 5th, 9 a. m., three groups, twenty-eight spots, very large group near the west edge. 6th, 8.15 a. m., four groups, sixteen spots, faculae very prominent. 7th, 8.45 a. m., four groups, twelve spots. Owing to the absence of observer no observations were made after the 7th.

DROUGHT.

Arkansas.—Springfield, Conway county: a severe drought prevailed during the month, causing much injury to the cotton crop in this part of the state. The entire rainfall for the month was less than one-half inch.

Little Rock: during the latter part of the month the weather was intensely hot and dry, and the crops suffered seriously.

Illinois.—Nokomis, Montgomery county: a copious rain fell on the 20th, which was of incalculable value to the crops. Previous to the above date the crops suffered seriously on account of drought, and when the rains came, in some instances they were too late to be of benefit.

Nashville, Washington county: abundant rains fell on the 18th, after a drought of nearly seven weeks duration.

Reports from Vandalia, Fayette county, on the 20th stated that no rain of consequence had fallen in that locality for six weeks preceding that date, and that the crops were suffering seriously.

Hillsborough, Montgomery county, 20th: the drought which has prevailed in this section for the last six weeks caused great damage to the corn crop. The pastures dried up, and stock suffered on account of scarcity of water.

Collinsville, Madison county: drought prevailed in this vicinity from July 29th to August 19th.

Shelbyville, Shelby county: after a drought of several weeks' duration an abundant rainfall occurred on the 20th.

Shawneetown, Gallatin county: a much needed and copious rain fell in this vicinity during the night of the 25-26th.

Indiana.—Greensburg, Decatur county: this region, after suffering from a protracted drought, was visited by rains on the 21st and 22d.

Clinton, Rush county: the month was remarkably dry: rainfall only 0.75 inch. The corn crop has been materially injured.

Spiceland, Henry county: August was unusually dry, only 0.40 inch of rain having fallen during the entire month.

Sunman, Ripley county: the rain of the 21st terminated in this vicinity the severest drought that has occurred in many years.

Vevay, Switzerland county: the weather during August was very dry, the rainfall for the month being 0.54 inch. The crops suffered serious injury in consequence of drought, and owing to scarcity of water in the cisterns it was necessary to haul water from the river for household uses.

Iowa.—Maynard, Fayette county: owing to the extremely dry weather during August the small streams became entirely dry.

Kansas.—Yates Centre, Woodson county: at the close of August the wells and cisterns were low and the crops were suffering in consequence of drought.

Louisiana.—Grand Coteau, Saint Landry parish: severe drought prevailed in this section during August, causing serious injury to corn, cotton, and sugar cane.

Maryland.—Fallston, Harford county: from August 8th to 28th, there was no appreciable rainfall, but rains fell from the 28th to 31st, which were of great benefit to the crops.

Michigan.—Hillsdale, Hillsdale county: the drought which prevailed during August in this part of Michigan, was the severest that has occurred for many years. The entire rainfall for the months of July and August of the present year was 1.78 inches. In some localities at the close of the month, the ground was dry to a depth of from two to four feet.

Mottville, Saint Joseph county: the streams and ponds in this vicinity at the close of August, were lower than they have been for many years. Only 0.70 inch of rain fell at Mottville during the month.

Thornville, Lapeer county: drought prevailed in this part of the state during August, the rainfall for the month being only 1.47 inches.

Port Huron: drought prevailed in this part of the state during nearly the whole month. The monthly rainfall was only 1.28 inches, being less than one-half of the average amount. On the 28th, 0.85 inch of rain fell.

Missouri.—Cape Girardeau, Cape Girardeau county: the heavy rainfall on the 28th was of great benefit to the crops which were suffering from drought.

Joplin, Jasper county: the heavy rainfall in this locality on the afternoon of the 20th was of great benefit to the crops which were suffering from drought.

Marshall, Saline county: a much needed rain fell in this vicinity on the 18th.

New Hampshire.—Autrim, Hillsborough county: previous to the 22d the month was very dry, and the wells in this vicinity began to fail. After the 22d the rains were plentiful.

New York.—Palermo, Oswego county: previous to the 21st the weather was very hot and dry; wells and streams began to fail and vegetation suffered seriously. The rains from the 21st to the end of the month terminated the drought.

Ohio.—McArthur, Vinton county: a copious rain fell on the 21st, greatly benefiting the crops which had been suffering for rain for many weeks. Numerous fires, caused by sparks from locomotives, occurred along the railroad tracks, and destroyed considerable property.

Cleveland, 20th: the extremely warm weather during the last ten days has seriously injured the crops and pastures in this vicinity. The rivers and streams are very low and many springs have failed. The roadways through central Ohio are covered with dust to a depth of several inches.

Cincinnati, 20th: the drought which has prevailed during the last six weeks has caused great injury to the various crops in the southern portions of Indiana and Ohio, and in northern Kentucky.

Columbus: the rainfall during August was only 0.70 inch. A total failure of the crops is threatened. The pastures have failed, and cattle are being fed with winter hay.

College Hill, Hamilton county: very dry weather prevailed during the month, only 0.70 inch of rain having fallen.

New Athens, Harrison county: during a greater part of the month there was an almost entire absence of rain. The streams and wells dried up and the pastures failed.

Province of Ontario.—Goderich, 20th: the weather continues

dry and hot, and vegetation is suffering. No rain has fallen for several weeks and serious brush fires are burning in the surrounding country.

Texas.—Fort Davis, Presidio county: the drought which prevailed in this part of Texas previous to the 18th, was the severest that has been experienced here for many years. Many of the cattle ranges were without pasturage or water. The rains of the 18th and succeeding days ended the drought, and were of incalculable benefit to the cattle interests in this county.

Rio Grande City: no rain fell in this vicinity during August. The first crop of corn harvested in June and July was very poor. At the beginning of August, the time for planting the second crop, planting was rendered impracticable on account of the dryness of the soil. In this vicinity several tests were made and the ground was found to be perfectly dry to a depth of six feet. The pastures for many miles around Rio Grande City failed entirely, and wells that were never before known to fail, became dry. Stock suffered seriously on account of scarcity of water and poor pasturage.

Indianola: severe drought prevailed during August. In the prairies, west of this place, the water in the creeks and "water holes" became very low, and in many instances vegetation was completely killed.

Austin, Travis county: there was an almost total absence of rain during August, in consequence of which the cotton crop promises a poor yield. At the close of the month pasturage was very poor, and water supply for stock was very limited.

Reports from Clarksville, Red River county, state that the crops in that region were promising, and the rains during August were plentiful.

Virginia.—Lynchburg: the damaging drought which prevailed during the seven weeks preceding the 29th was ended by the copious rain of the above date.

Wytheville, Wythe county: severe drought prevailed in this part of Virginia during August.

EARTHQUAKES.

The following extract is from the "New York Herald" of August 5th:

LONDON, ENGLAND, August 4, 1884.—Severe earthquake shocks were felt yesterday at Foca (probably Fotcha), in Bosnia.

Santa Barbara, Santa Barbara county, California: three very slight earthquake shocks occurred at about 1 a. m. of the 4th; there was also a slight shock on the night of the 2-3d.

The following extract is taken from "Nature," of August 14, 1884:

Earthquakes have been frequent and widespread during the past few days. The inhabitants of the towns and villages along the whole range of the Alban hills were alarmed at 2 a. m. on August 7 by a sharp shock of earthquake, followed by another at 3.15 a. m. The direction taken by the wave was through Velletri, Nemi, Ariccia, Albano, Castle Gandolfo, and Rocca di Papa, and Frascati. The shocks were most severely felt at Rocca di Papa, but no damage was done beyond the falling of two chimneys at Ariccia. At 3.30 a severe shock, quickly followed by another, was distinctly felt at Rome, and that which shook the Alban hills extended as far as Porto d'Anzio, on the coast.

On the afternoon of Sunday, August 10th, an earthquake occurred, which, from the reports that have been received at the Signal office, appears to have generally affected an area extending along the Atlantic coast from northern Massachusetts to southern Delaware, and inland, to points in southeastern New York, and in the eastern portions of Pennsylvania and Maryland. Reports from Richmond, Virginia, state that at about the time of the occurrence of the earthquake reported from other points, a slight shock was experienced in the western part of that city. Titusville, Crawford county, in northwestern Pennsylvania, is the most westerly point at which the shock is reported to have been felt, and Brattleborough, Windham county, Vermont, is the most northerly station from which reports have been received at this office.

Professor C. G. Rockwood, jr., of Princeton, New Jersey, reports the following: "On Sunday, August 10th, between

seven and eight minutes after 2 p. m., the middle and eastern states experienced a decided earthquake shock more severe and extensive than has occurred in that locality for some years. The area affected extends along the coast states from Washington, District of Columbia, and Baltimore, Maryland, to Portland, Maine, and Burlington, Vermont; and on the west may be bounded by a nearly straight line from Burlington to Harrisburg, Pennsylvania. The intensity was greatest in the vicinity of New York City, which is also about the centre of the district affected. It nowhere did any damage beyond breaking crockery and occasionally cracking a house wall; no bodily injury occurred, although it is stated that one or two deaths resulted from the mental effect of fright upon persons in feeble health. The time was about 2 hours 7½ minutes p. m., eastern standard time. Several good and close time observations have been reported, but it is not yet possible to say whether they indicate a progress of the wave in any particular direction or not. So far, as yet compared, all the reports seem to point to the formation of a geological fault in the rocks of the earth's crust somewhere in the neighborhood of New York Bay as the probable origin of the vibration."

The following reports concerning the earthquake above referred to have been received:

Connecticut.—New Haven: at 2.15 p. m. (local time) of the 10th an earthquake occurred in this city and in the adjacent towns. There were two distinct vibrations, the first shock being of about ten seconds duration. The disturbance resembled the jar caused by the movement of an unusually heavy train, and was felt by persons in buildings only, although persons out of doors heard the noise. Crockery, etc. rattled on the shelving and pictures suspended from the walls swung to and fro. The movement of the latter indicating that the direction of the shock was from northeast to southwest. Near the town of Bradford, eight miles distant, the water in a small stream near that place was forced upward, in the form of a water-spout, to a height of several feet.

Meridian, New Haven county: an earthquake shock was plainly felt at 2 p. m. on the 10th. The wave passed from southwest to northeast. At Waterbury the shock lasted for about thirty seconds, and pictures on the walls swung to and fro.

Hartford, Fairfield county: at 2.09 p. m. of the 10th an earthquake shock occurred, which caused considerable excitement. Persons were frightened from their dwellings, and ornaments, etc. were broken. At Bridgeport the shock is reported to have lasted fifteen seconds and was accompanied by a loud, rumbling noise. At Stratford, Fairfield county, two chimneys were thrown down. The water in the Housatonic river was violently agitated. Large waves were observed to recede from the shores and meet in the centre of the river, forming a peculiar spectacle.

Norwich, New London county: a sharp shock of earthquake was felt here, and in the neighboring towns at about 2 p. m. on the 10th. Houses were perceptibly shaken, and bells were rung. Many persons were alarmed but no damage was done. At New London two shocks were felt and were of force sufficient to move furniture, etc.

Hartford: at 2.39 p. m. on the 10th, three long and convulsive earthquake shocks were felt throughout this city and vicinity, the disturbance being most severe in the higher localities. Many persons were thrown down, and in some cases slight bodily injury occurred. At the second shock bells were rung, houses violently rocked, and all crockery and glassware were thrown down. Great alarm prevailed among the people who ran from the houses into the streets. One man was thrown from his wagon when the second shock occurred. At the jail, which was crowded with prisoners, a panic ensued and one of the inmates died from fright. At the state prison in Weathersfield, similar confusion prevailed.

Delaware.—Delaware Breakwater: at about 2.10 p. m. of the 10th a slight earthquake shock was felt at this place. The station building was suddenly shaken for about five seconds.

Wilmington: at 1.51 p. m. on the 10th an earthquake shock occurred which shook buildings sensibly throughout the city. The direction of movement was about 10° north of east.

District of Columbia.—The following extract is from the "New York Herald" of August 11th:

WASHINGTON, D. C., August 10, 1884.—Commander Sampson, assistant superintendent of the Naval Observatory, reports that he observed slight vibrations of the earth about two o'clock this afternoon, lasting about sixteen seconds. He was in the second story of his house, adjoining the observatory. The windows of the room rattled, and the articles on a marble-topped table moved. No phenomena were observed on the lower floors of the house. A few persons have reported this evening that they observed some unusual motion of the earth about two o'clock this afternoon, but very few such reports have been made.

Maryland.—Fallston, Harford county: the earthquake shock of the 10th was felt at Jerusalem Mills, two miles south of this place.

Baltimore: a slight earthquake shock was felt in some parts of this city at about 2.10 p. m. on the 10th. It was felt only in the most elevated localities, and was not perceptible along the river front and over the made ground of the city. Reports from Mechanicsburg, Frederick county, state that a slight shock was felt at that place.

Rockville, Montgomery county: at 2.15 p. m. of the 10th, an earthquake was sensibly felt in all parts of the town and at adjacent points in this county. At a residence three miles from Rockville, persons were awakened from sleep, and articles in the rooms were disarranged. The shock was also felt at points between Rockville and West Washington, District of Columbia.

Massachusetts.—Williamstown, Berkshire county: a slight earthquake occurred at 2.02 p. m. of the 10th. At Lanesborough, fifteen miles south, glasses were overturned.

Worcester, Worcester county: a slight earthquake shock was felt in this city at 2.06 p. m. of the 10th. At the State insane asylum the shock was more perceptible than elsewhere in this vicinity.

The following extract is taken from the "New York Herald" of August 11th:

BOSTON, August 10, 1884.—No less than six distinct shocks were felt in this section this afternoon. Professor Pickering, of Harvard Observatory, says he first noticed a tremulous movement of the earth followed by the swaying of the building and creaking of the timbers. The shock was first noticed about seven minutes past two p. m., continuing about ten seconds. He has no record of previous shocks, their duration being so short as to make it impossible to compute accurately their extent or duration.

The shocks were plainly felt throughout the city, the jar being clearly defined in the outlying districts, and the occupants of second story tenements felt the shock more plainly than those on the ground floors.

Springfield: an earthquake shock occurred at 2.08 p. m., on the 10th. There were several marked pulsations lasting about ten seconds. The shock was also felt at Pittsfield and northward along the Connecticut river to Brattleboro, Vermont.

Taunton, Bristol county: a tremor of the earth was felt about 2 p. m., of the 10th; it was very slight but was felt at numerous places in this neighborhood.

Amherst, Hampshire county: a slight earthquake shock occurred at 2 p. m., of the 10th.

Milton, Norfolk county: an earthquake occurred at 2.09 p. m., on the 10th; the undulations were very sensibly felt, and caused windows to rattle.

Somerset, Bristol county: two very slight tremors of the earth occurred at 2.08 p. m., of the 10th.

New Jersey.—South Orange, Essex county: a slight earthquake occurred at 2.08½ p. m., of the 10th, lasting five or six seconds.

Somerville, Somerset county: two slight shocks of earthquake, separated by an interval of about ten seconds, occurred at about 2 p. m. on the 10th.

Sandy Hook: at 2.05 p. m. of the 10th an earthquake, accompanied by a deep rumbling noise, occurred. In the Western Union telegraph building the contents of the battery cells were thrown out.

Little Egg Harbor: at 2.07 p. m. of the 10th an earthquake

shock of about ten seconds duration occurred, causing the signal office building to tremble considerably; the vibration was apparently from north to south.

Atlantic City: at 2.07 p. m. on the 10th three light shocks of earthquake were felt in this city. The shocks were of about two seconds duration and the movement was apparently from northeast to southwest. The timbers of the building in which the signal office is located cracked, and light articles were displaced.

Barnegat City: at 2.07 p. m., on the 10th, an earthquake shock was felt at this station and in the surrounding country. The trembling of the earth was scarcely perceptible. The movement was apparently from north to south and lasted about seven or eight seconds. No effect on the ocean was caused by the shock, so far as could be determined by the observer.

Paterson, Passaic county: three shocks of earthquake were felt on the 10th, occurring at 11.15 a. m. and 1.45 and 2.08 p. m., respectively. The first two shocks were very slight, but the third was quite severe and caused much alarm throughout the city.

Newark: at 2.10 p. m. of the 10th, an earthquake occurred, lasting ten seconds. There was at first a slight tremor, and then a continued and decided convulsive movement that finally died away in gentle tremors. Every building in the city was affected by the shock, and many persons were frightened from their dwellings into the streets. The disturbance was noticed upon all the waters about Newark, the smooth surface becoming suddenly agitated.

Bordentown, Burlington county: at 2.08 p. m. on the 10th, an earthquake shock occurred which lasted about thirty seconds. The shock was most severe on a neighboring hill, where several children were thrown down. Persons who were at the shores of the Delaware river, state that the shock produced a large wave.

Elizabeth, Union county: the earthquake of the 10th began exactly at 2.07 p. m. and lasted one-half minute. The direction was from south to north; the shock increased in violence from the beginning for about fifteen seconds and then gradually decreased.

Vineland, Cumberland county: at 2.15 p. m. of the 10th two slight shocks of earthquake, of about ten seconds' duration, were felt.

New York.—Albany: at 2.10 p. m. of the 10th an earthquake occurred, lasting several seconds. The shock was, apparently, most severe in the western part of the city.

New York City: the earthquake of August 10th, occurred at 2.14 p. m., true local time, and lasted ten seconds. There were three shocks, of which the second was the most violent, and the third the most feeble. In many of the thickly populated tenement-house districts of this city, the shock caused much alarm. In the neighboring cities the shock was similar to that experienced in New York City. It is stated that on Long Island the shock was violent enough to shake apples and peaches from the trees. So far as can be learned the waters of the rivers bounding the city were not disturbed by the earthquake. The pilots, deck hands, and passengers of the ferry boats which were crossing at the time, state that they did not observe a swell greater than that caused by the light breeze blowing, and did not know that the shock had occurred until they reached the shore. Although the water in North and East rivers was apparently unaffected there was considerable disturbance in the bay, where the water became agitated and presented the appearance of having been disturbed by a strong wind. On some of the ferry boats plying in the bay, the shock caused the chains and ropes to shake. The yacht "Penguin," off Fire Island, five miles east of Jones' Inlet, and one mile from the shore, reports that a deep rumbling sound was heard at the time of the earthquake.

The general direction of the earthquake wave appears to have been from 10° north of east to about 10° south of west.

Port Jervis, Orange county: two earthquake shocks, oc-

curing in quick succession and lasting about thirty seconds, were felt at about 2.30 p. m. of the 10th. Substantial buildings were perceptibly shaken by the shocks.

Poughkeepsie, Dutchess county: at about 2.15 o'clock on the afternoon of the 10th a severe earthquake shock occurred in the region along the Hudson river. In many houses in Poughkeepsie, crockery, ornaments, etc., were thrown to the floors. Boatmen report that the shock was not perceptible on the Hudson river in the vicinity of Poughkeepsie.

At Matteawan, Dutchess county, the shock was distinctly felt and is reported to have been of about ninety seconds duration.

Nyack, Rockland county: at 2 p. m. of the 10th a violent commotion of the earth was felt here, apparently moving from southwest to northeast.

Peekskill, Westchester county: at 2.07 p. m. on the 10th two severe shocks of earthquake occurred, which were accompanied by a low, rumbling sound, resembling the passing of heavy artillery over a hard road. Windows, crockery, etc., were considerably shaken by the shocks, which were of about two seconds duration; the vibration was from east-northeast to west-southwest. At Chappaqua, Westchester county, the shock caused large trees to sway back and forth, and buildings were violently shaken.

Phoenicia, Ulster county: at 2.10 p. m. of the 10th this place was considerably shaken by an earthquake shock.

Newburg, Orange county: a light earthquake shock, lasting three or four seconds, was felt in this locality at 2.10 p. m. on the 10th. The disturbance was most perceptibly felt on the brow of the hills; it was felt along the river front also, but not so plainly as on the hill tops. In some houses light articles were moved, and chandeliers swayed to and fro. In some sections of this city the vibrations were so slight that they were unnoticed.

Troy, Rensselaer county: at about 2 p. m. on the 10th, an earthquake shock, lasting about one minute, was plainly felt in different parts of this city. At points along the line of the Troy and Boston railroad the shock was plainly felt.

Pennsylvania.—Haverford College, Montgomery county: at 2.08 p. m. of the 10th, a decided shock of earthquake of about fifteen seconds' duration occurred. The wave was apparently from the northeast.

Titusville, Crawford county: a slight shock of earthquake occurred on the afternoon of the 10th. In the Hotel Brunswick at this place, chairs were moved and windows rattled.

Bath, Northampton county: two distinct earthquake shocks were felt at this place at 2 p. m. of the 10th. Each lasted about one second and were separated by an interval of about one second.

Wilkesbarre: on the afternoon of the 10th an earthquake shock occurred at this place. Four or five distinct undulations were felt in quick succession. No serious damage was done, but buildings were considerably shaken.

Philadelphia: at about 2.12 p. m. (standard time) on the 10th this city and surrounding country were shaken by an earthquake, which, according to various estimates, lasted from four to eight seconds. The movement is described as having been more of a vibration, or a tremor, than a shock, but houses were shaken with more or less violence, bells were rung, window-sashes rattled, and a few weak chimneys were demolished. In the signal office the chandeliers, which were suspended so as to move freely in any direction, were observed to swing from north to south, describing an arc of about one foot.

A small island in the Delaware river, on which Ridgeway Park is situated, was violently shaken, and the water in the river was considerably agitated.

Harrisburg, Dauphin county: a slight earthquake shock was felt in this city on the afternoon of the 10th. It was preceded by a low rumbling noise. No damage was done, but buildings were shaken and small articles were displaced.

Chester, Delaware county: this place was sensibly shaken by an earthquake at about 2.15 p. m. on the 10th. Several chim-

neys were thrown down, crockery was broken, and the plastering shaken from the ceilings.

Allentown, Lehigh county: two distinct earthquake shocks were felt shortly after 2 p. m. on the 10th. There was a general rocking of buildings, and a chimney was thrown down. In some instances the movement was so violent that persons sleeping on lounges were thrown to the floor.

Easton, Northampton county: an earthquake shock was felt through the Lehigh valley on the afternoon of the 10th.

York, York county: an earthquake shock was perceptibly felt in this city about 2.15 p. m. on the 10th; houses were shaken, and furniture, crockery, etc., were moved.

Lancaster, Lancaster county: a distinct earthquake shock occurred soon after 2 p. m. on the 10th. The buildings were only slightly shaken.

Phoenixville, Chester county: at about 2 p. m. on the 10th, an earthquake shock, lasting ten seconds, was felt here. Reports from stations along the Pickering valley railroad state that the shock was also felt at points along that road.

Reading, Berks county: at 2.12 p. m. on the 10th, two distinct shocks of earthquake were felt throughout this city and county. The people were considerably alarmed, many running into the streets. Houses were shaken so violently as to cause the window blinds to fall to the ground.

Pottstown, Montgomery county: a very perceptible tremor or rocking of the earth occurred about 2 p. m. on the 10th. The shock lasted two or three seconds and caused houses to shake with such violence as to move furniture, crockery, etc.

Norristown, Montgomery county: a perceptible earthquake shock was felt shortly after 2 p. m., on the 10th. The windows in the houses in all parts of the town rattled violently. A chimney was thrown from a dwelling, and the cell doors of the county prison shook with such violence as to considerably alarm the inmates.

Rhode Island.—Narragansett Pier: a light shock of earthquake occurred at about 2 p. m., of the 10th. It was felt by persons in the upper portion of large buildings.

Point Judith: two very slight shocks of earthquake were felt at 2.12 p. m., on the 10th; they were of about three and two seconds duration, respectively, and were separated by an interval of one second. The building in which the Signal office is located was gently shaken, the direction of vibration being from north to south. The shock was so slight that only a few persons noticed it.

Providence: an earthquake shock occurred at 2.10 p. m., on the 10th, lasting nearly one minute. Bells were rung and crockery broken. Considerable alarm was caused by the shock.

Vermont.—Brattleborough, Windham county: two distinct shocks of earthquake were felt here at 2.10 p. m. of the 10th. The motion was apparently from south to north. Houses were shaken, crockery rattled, and the people were considerably alarmed.

Virginia.—Richmond: a few persons residing in the western part of this city, claim to have felt a slight shock on the afternoon of the 10th, about the time of the occurrence of the earthquake at northern points.

Fort Myer (near Washington, District of Columbia): the earthquake shock on the afternoon of the 10th, was felt at this place.

The observer at Knoxville, Tennessee, reports that an earthquake shock, lasting about six seconds, occurred in that vicinity at 7.45 p. m. on the 24th. It was accompanied by a low rumbling sound like distant thunder, and was sufficient to cause windows to rattle.

"The Nautical Gazette" of September 18, 1884, publishes the following:

The American brig "Charles Dennis," Captain Connacher, from Friendship, Me., arrived at Pensacola on Monday last, after a passage of forty-two days. On August 15th, in latitude 38 degrees north, longitude 75 degrees west, about 5 degrees off shore, she encountered a marine earthquake, which is supposed to have been a sequence of the one which shook New York and New England. The brig was on the eastern edge of the Gulf Stream. The appearance of the sky denoted a hurricane, consequently the brig was put

under short sail. The wind veered to every point of the compass and then lulled. Suddenly a roar of the sea, deeper than the loudest thunder, was heard. It boiled like a pot, heaping up great seas that tossed the brig like an egg-shell now on the crest of a wave and then in the trough, her foreyard crossing to the water on either side. When the commotion was over it was found that the foremast was sprung, the foretopmast head carried away, and the vessel seriously crippled. After fishing the foremast the captain proceeded on his voyage, meeting with no more mishaps. The earthquake must have had its centre some four hundred or five hundred miles east of Hatteras.

METEORS.

Numerous meteors have been observed during the month; the reports of observations are given below, that furnished by Prof. C. G. Boerner, of Vevay, Indiana, being especially interesting:

Arizona.—Fort Apache, 9th: from fifteen to twenty meteors were observed between 8.05 and 9.25 p. m.; the general direction of their flight was from east of north to west of south; two of them were unusually large and brilliant.

Arkansas.—Lead Hill, 10th, 11th, 13th, 19th, 20th, 24th, 28th, and 30th.

Connecticut.—Bethel, 6th, 28th.

Dakota.—Webster, 18th: four bright meteors were observed within ten minutes.

Florida.—Archer, 28th.

Illinois.—Anna, 10th: at 8 p. m. several meteors were seen passing from north to south.

Indiana.—Wabash, 14th: at 7.05 p. m. a small but very brilliant meteor appeared about 40° above the s. horizon and moved slowly in a ssw. direction; it disappeared when about 10° above the horizon. At 8.10 p. m. of the 19th a small but brilliant meteor appeared northeast of Arcturus and descended to the southwestward, disappearing when about 15° above the horizon.

Logansport, 17th, 18th, 19th, 20th.

Vevay: Professor Charles G. Boerner reported as follows: 10th, from 8.23 to 9.40 p. m., sixteen meteors of more or less brilliancy were observed; they moved in various paths, the duration of flight not exceeding two seconds. At 9.40 p. m. the bright full-moon had attained an altitude to obscure all stars below the first magnitude, and meteors became altogether invisible, watching was therefore discontinued. On the 11th, from 8.46 to 9.15 p. m., six meteors were observed. On the 12th, from 8.03 to 8.45 p. m. four meteors were observed; at 9.30 p. m., no other meteors appearing, watching was discontinued.

Referring to the above, Professor Boerner states: "The total number (26) of meteors were observed on the nights of the 10th, 11th, and 12th; of these eighteen were conformable to the radiant in Perseus, and eight non-conformable.

Of the above number there were thirteen of the first magnitude with an average duration of flight of 2.1 seconds; eight of the second magnitude with an average duration of flight of 1.3 seconds; five of the third magnitude with an average duration of flight of 1.2 seconds. The maximum number fell on the 10th, with a gradual decrease on the 11th and 12th; only two were followed by long luminous trains; of the remainder the trains were short and not well defined. It may reasonably be supposed that a larger number would have been visible on a dark night, unfortunately, as it was, the opportunity was prevented by the interposing moon."

Indian Territory.—Cantonment, 12th: a few meteors were seen early in the evening. 13th, a few meteors were observed in the early part of the night.

Iowa.—Burlington, 12th: a brilliant meteor was observed at 9.05 p. m., passing from the zenith in a southerly direction and leaving a trail resembling the tail of a comet. 21st, a meteor was seen moving in a northeasterly direction. 27th, a brilliant meteor was observed moving in a southerly direction.

Davenport, 9th: a meteor was observed in the southern sky. 23d, a meteor was observed moving from south to north; another was also seen on the same evening moving from north to south.

Fort Madison, 21st: a meteor passed over the station at 10 p. m. moving from south to north and of the size of a lighted lamp; a train of sparks followed its downward course.

Monticello, 21st: a bright meteor was observed in the southwest at 9 p. m.

Kansas.—Allison, 30th: at 9 p. m. several small meteors were observed. Fort Scott, 18th.

Louisiana.—Liberty Hill, 7th: at 7.30 p. m. a meteor was observed passing from east to west.

Maryland.—Fallston, 20th: at 9.30 p. m. a bright meteor was observed in the constellation Ursa Major; it moved horizontally towards the west, leaving a trail about 20° long.

Woodstock: 12th, 15th, 16th, 17th, 20th, 21st, 24th.

Massachusetts.—Rowe, 13th: several meteors were observed between 8.45 and 9.15 p. m.

Fall River, 19th: a meteor was visible at 9.30 p. m., about 30° above the horizon, and moving from north to south, showing green and yellow colors.

Michigan.—Escanaba, 19th: numerous meteors were observed on this date; (twenty-three were counted in thirty-five minutes).

Ionia, 19th: at 8.30 p. m., a meteor was observed in the southwest at an altitude of 30°.

Nebraska.—Tecumseh, 3d; Yutan, 24th, 25th; Red Willow, 26th.

New Jersey.—Moorestown, 15th.

New York.—Factoryville, 19th: at about 9.45 p. m., a large meteor passed over the station, moving from northeast to southwest; its apparent diameter was about eight to ten inches.

Menand Station (near Albany), 19th: at 9.30 p. m., a meteor was observed to pass from near the zenith to the southwestern horizon. Its appearance resembled a large blue star, followed by a long train of light.

Phelps, 1st: Professor Brooks, of the Red House Observatory, about 2 a. m., observed a magnificent meteor moving from near the zenith toward the west. It was of extraordinary brilliancy, illuminating the country as if by an electric light, leaving a train of sparks forty degrees in length. It was visible several minutes, and with the telescope was seen to roll and curve like a wreath of smoke, with a slow motion northward.

Hannibal, 19th: a brilliant meteor was seen at 9.30 p. m. It started from Venus and traveled southwest, leaving a train, broken at intervals, and of a pale blue color.

Le Roy: 12th, 13th.

North Carolina.—Brevard, 15th: meteors passing from south to north were observed on this date; they were also seen on the 18th moving in the same direction.

Chapel Hill, 20th: a very bright meteor was observed in the south about 45° above the horizon; it fell toward the horizon in a sudden burst of light, leaving a trail visible for a few seconds.

Kelley's, near Raleigh, 17th, 18th.

Ohio.—Cincinnati, fourteen meteors were observed between 9 and 10 p. m. of the 8th, their general course being from east to west. Ten meteors were also observed between 9 and 10.30 p. m. on the 10th.

Toledo, 22d: from 8 p. m. to midnight of the 22d shooting stars were numerous, the greater number appearing in the southeastern sky. They were also observed between the same hours on the 23d.

College Hill, 14th, 19th; Jacksonborough, 23d.

Oregon.—Albany, 9th, 10th.

Pennsylvania.—Pittsburg, 10th: meteors were observed passing from north to south; they were also seen on the 15th and 17th.

Leetsdale, 10th: at 9 p. m. a brilliant meteor was visible for about three seconds; the head was of light blue color, followed by a luminous red trail which remained visible for about fifteen seconds. At 10.07 p. m. a small meteor shot from northwest to southeast; it was of a silvery white color and left no trail, but appeared to be very low and to travel rapidly.

Dyberry, 11th: at 9 p. m. about a dozen small meteors were seen, mostly in the south.

South Carolina.—Stateburg, 9th: at 9 p. m. two meteors were observed; they moved from north to south and from northeast to southwest, respectively. On the 11th, at 9 p. m., two bright meteors were observed within a few seconds interval of each other; they moved in nearly parallel and horizontal lines from northeast to southwest. 15th, 9 p. m., a meteor was observed.

Tennessee.—Knoxville, 23d: numerous meteors were observed after 8 p. m., the direction of movement in every case being from east to west. On the 25th several meteors were observed during the evening.

The following extract is taken from the August report of the "Tennessee Weather Service."

Meteors were observed as follows: Xenophon, 9th, 11th, 13th; Parksville, 19th, large, in east, direction west. Riddleton, 12th, 9 p. m., in east, direction west; on 18th, at 10.30 p. m., direction west; on 19th, 1.30 a. m., in west; 26th, at 8.35 p. m., in south, direction southeast. Hardison's Mills, 10th (two); 15th, 9 p. m. Hurricane Switch, 15th; Centreville, 29th, about 8.30 p. m., large and brilliant, crossing the heavens from the zenith to the southern horizon. Dyersburg, 24th, beautiful blue color.

Texas.—Indianola, 9th: at 9.20 p. m., meteors were seen shooting across the southern sky at an altitude of 25°.

Virginia.—Marion, 10th: at 9.30 p. m., three meteors were seen, one moved from north to south, and the others from east to west. On the 12th, three meteors observed.

Cape Henry, 19th: three meteors were observed between 8 and 9 p. m.

Chincoteague, 5th; Variety Mills, 20th, 23d, 24th.

Washington Territory.—Dayton: an unusual number of shooting stars were observed during the month.

Wisconsin.—Milwaukee, 10th: a brilliant meteor was observed at 7.50 p. m., in the north, at an altitude of about 45°; it moved toward the southwest and disappeared, leaving a long trail of light which remained visible for from ten to fifteen seconds. Other meteors, moving toward the southwest, were observed during the night.

Beloit, 19th.

WATER SPOUTS.

Key West, Florida: on the 22d at about 4.30 p. m. three water spouts were observed about three miles north of this station. They moved rapidly southward, remaining visible about twenty minutes. The agitation of the water was plainly seen, but no noise was heard.

Mobile, Alabama: a water spout is reported to have been observed near Fort Morgan on the 10th.

The "New York Maritime Register," of September 10th, reports the following:

The schooner "Wilaka," which arrived at Saint John, New Brunswick, September 3d, from Pensacola, reported that on August 26th, in latitude 33° 30' N., longitude 76° 28' W., she sighted three water spouts. Two of them appeared together and the other a few minutes later. The wind was northeast at the time, blowing moderately, with rain squalls. The sight was a grand one, as the spouts kept their cone-like shape a long time.

The following extract is taken from the "New York Herald," of August 30, 1884:

Quebec, August 27, 1884: a magnificent water spout was seen on the Saint Lawrence river, at Port Neuf, during a severe thunder storm to-day. It was fully formed and afforded a spectacle seldom seen except at sea. During its continuance it moved down the river for a distance of more than two miles, and it parted opposite Point Platon. Rain descended in torrents immediately afterward.

PRAIRIE AND FOREST FIRES.

Denver, Colorado: reports received at this place on the 8th, stated that prairie fires had burned over an area thirty miles in length along the Platte river, between Denver Junction and Frenchman. The stock interests in that region sustained heavy losses.

East Tawas, Iosco county, Michigan 22d: forest fires have caused great injury to the crops in this county, much standing grain and stacked hay having been consumed, together with other property. It is estimated that an area of 5,000 acres

Meteorological record of voluntary observers and army post surgeons—August, 1884.

Temperature				Temperature				Temperature				Temperature						
District and station.				District and station.				District and station.				District and station.						
Mean.	Maximum.	Minimum.	Rainfall.	Mean.	Maximum.	Minimum.	Rainfall.	Mean.	Maximum.	Minimum.	Rainfall.	Mean.	Maximum.	Minimum.	Rainfall.			
New England.				Mid. Atlantic States—Cont'd				Lower Lake Region.				Missouri Valley—Cont'd.						
Hartford, Conn.....	96	43	2.87	Great Falls, Md.....	74	92	58	1.73	Margaretta, Ohio.....	72	92	51	1.71	Pierce City, Mo.....	71	91	52	3.70
Bethel, Conn.....	66	89	4.4	West Washington, D. C.....	67	92	58	0.58	Hiram, Ohio.....	70	90	55	1.63	Greenfield, Mo.....	74	96	50	0.50
Orono, Me.....	66	89	4.4	Wytheville, Va.....	67	92	58	2.40	Cleveland, Ohio.....	68	88	48	1.90	Atchison, Kans.....	72	94	54	4.20
Cornish, Me.....	67	92	4.8	Factoryville, N. Y.....	67	93	36	2.07	North Lewisburg, Ohio.....	72	92	48	0.80	Harrisonville, Mo.....	76	98	63	2.30
Amherst, Mass.....	69	92	4.8	White Plains, N. Y.....	72	95	50	6.64	Wauson, Ohio.....	68	94	39	1.12	Manhattan, Kans.....	74	100	54	5.02
Dudley, Mass.....	68	87	5.5	Salem, N. J.....	93	95	2.47	Palermo, N. Y.....	66	90	46	2.19	Independence, Kans.....	73	96	53	5.83	
Mendon, Mass.....	68	87	5.5	Fort Columbus, N. Y.....	72	92	50	8.72	Humphrey, N. Y.....	65	90	48	4.80	Wyandotte, Kans.....	70	93	48	5.03
Milton, Mass.....	67	81	5.2	Fort Monroe, Va.....	75	90	64	3.12	Ithaca, N. Y.....	69	91	39	3.75	Fort Scott, Kans.....	74	95	60	4.71
New Bedford, Mass.....	67	81	5.2	Madison Barracks, N. Y.....	68	88	42	2.69	Penn Yan, N. Y.....	65	90	40	2.13	Salina, Kans.....	75	84	65	3.09
Somerset, Mass.....	72	91	4.4	Pittsburg B'ks, N. Y.....	79	96	42	2.19	North Volney, N. Y.....	66	95	49	3.20	Emporia, Kans.....	72	93	51	4.43
Princeton, Mass.....	66	89	4.3	David's Island, N. Y. H.....	73	94	37	5.06	Hudson, Mich.....	64	90	40	1.29	Sherlock, Kans.....	77	90	56	8.20
Westborough, Mass.....	69	93	5.0	Fort McHenry, Md.....	90	97	57	1.63	Mount Forest, Ont.....	66	90	43	3.54	Yates Centre, Kans.....	73	100	47	1.51
Taunton, Mass.....	69	93	5.0	South Atlantic States.				Fort Niagara, N. Y.....	68	92	45	0.55	Clay Centre, Kans.....	72	96	55	5.08	
Fall River, Mass.....	68	83	4.7	Lenoir, N. C.....	86	61	.....	Upper Lake Region.				Westmoreland, Kans.....	71	95	48	5.75		
Worcester, Mass.....	68	87	4.5	Lincolnton, N. C.....	73	77	70	3.60	Manitowish, Wis.....	65	84	43	4.81	Logan, Iowa.....	71	95	43	0.41
Antrim, N. H.....	67	92	4.8	Raleigh, N. C.....	77	91	72	3.60	Wausau, Wis.....	63	86	38	4.63	Webster, Dak.....	71	95	43	0.41
Weir's Bridge, N. H.....	67	92	4.8	Highlands, N. C.....	64	82	52	4.03	Ripon, Wis.....	65	85	47	.....	Marquette, Nebr.....	78	90	66	1.70
Lake Village, N. H.....	67	92	4.8	Flat Rock, N. C.....	69	82	55	3.51	Embarass, Wis.....	67	86	52	7.70	W. Leavenworth, Kans.....	73	94	52	5.50
Bristol, N. H.....	67	92	4.8	Statesville, N. C.....	78	91	61	1.36	Sussex, Wis.....	65	87	46	3.14	Topeka, Kans.....	71	95	51	5.36
Ashland, N. H.....	67	92	4.8	Weldon, N. C.....	75	92	62	1.86	Franklin, Wis.....	66	90	45	2.94	Guttenberg, Iowa.....	66	90	48	4.59
Woodstock, N. H.....	67	92	4.8	Chapel Hill, N. C.....	76	90	50	4.64	Beloit, Wis.....	66	90	45	2.94	Fort Robinson, Nebr.....	70	97	42	1.00
Belmont, N. H.....	67	92	4.8	Brevard, N. C.....	71	90	54	2.57	Hillsdale, Mich.....	66	90	37	0.62	Fort Sisseton, Dak.....	65	86	41	4.27
Wolfborough, N. H.....	67	92	4.8	Milledgeville, Ga.....	75	92	60	2.02	Swartz Creek, Mich.....	66	90	37	0.62	Fort Sully, Dak.....	71	99	48	0.73
Providence, R. I.....	67	92	4.8	Athens, Ga.....	75	92	60	2.02	Ionis, Mich.....	65	92	39	0.55	Rocky Mountain Slopes.				
Charlotte, Vt.....	67	92	4.8	Stateburg, S. C.....	76	91	60	3.29	Marshall, Mich.....	65	92	39	0.55	Red Willow, Nebr.....	74	96	47	5.24
Burlington, Vt.....	67	92	4.8	Florida Peninsula.				Northport, Mich.....	65	92	39	0.55	Stockham, Nebr.....	80	92	68	2.70	
Woodstock, Vt.....	67	92	4.8	Archer.....	79	99	71	5.35	Manistique, Mich.....	61	84	35	4.25	Maud, Kans.....	70	97	57	3.44
Dorset, Vt.....	67	92	4.8	Mayport.....	80	.....	6.32	Traverse City, Mich.....	61	84	35	4.25	Wellington, Kans.....	70	97	57	3.44	
Lunenburg, Vt.....	65	87	4.0	Tallahassee.....	81	91	74	.....	Kalamazoo, Mich.....	62	92	44	1.82	Allison, Kans.....	68	95	48	3.14
Newport, Vt.....	68	92	4.2	Limons.....	81	90	71	8.25	Thorville, Mich.....	68	93	46	1.47	Pueblo, Colo.....	70	91	54	2.35
Stratford, Vt.....	73	90	5.0	San Augustine.....	79	91	70	10.02	Mendon, Mich.....	68	93	40	1.47	Tucson, Ariz.....	71	92	50	1.15
Rowe, Mass.....	66	86	5.5	Eastern Gulf States.				Fort Wayne, Ind.....	71	96	52	0.95	Fort McDowell, Ariz.....	67	113	50	1.18	
Williams College, Mass.....	66	88	4.6	Green Springs, Ala.....	77	96	64	1.04	Logansport, Ind.....	72	93	51	1.83	Fort Lewis, Colo.....	60	87	38	2.86
Gardiner, Me.....	64	83	4.5	Luling, Ala.....	82	95	63	0.86	Sycamore, Ill.....	66	87	51	3.43	Fort Concho, Tex.....	82	103	60	0.96
Middle Atlantic States.				Forsyth, Ga.....	79	99	68	.....	Marengo, Ill.....	66	89	47	3.30	Fort Fred Steele, Wyo.....	65	91	38	0.70
Dale Enterprise, Va.....	72	93	5.6	Fort Barrancas, Fla.....	84	96	67	2.89	Sanwich, Ill.....	71	94	51	1.93	Fort Randall, Dak.....	71	96	44	2.39
Wytheville, Va.....	70	86	4.8	Mt. Vernon B'ks, Ala.....	81	101	58	4.95	Wilcox, Ill.....	70	92	50	3.31	Fort A. Lincoln, Dak.....	68	96	44	4.18
Variety Mills, Va.....	71	92	5.4	Western Gulf States.				Lansing, Mich.....	63	88	35	4.29	Fort Keogh, Mont.....	71	103	39	1.76	
Acotink, Va.....	70	96	61	Cleburne, Tex.....	85	98	56	0.62	Fort Brady, Mich.....	68	88	35	4.29	Fort Ellis, Mont.....	65	93	37	1.10
Blacksburg, Va.....	74	98	5.5	New Ulm, Tex.....	83	86	79	0.21	Extreme Northwest.				Fort Union, N. Mex.....	64	92	43	7.80	
Summit, Va.....	74	98	5.5	Clarksville, Tex.....	80	101	66	4.65	Richardson, Dak.....	64	91	49	6.40	Fort Shaw, Mont.....	63	96	34	2.30
Johnston, Va.....	78	91	6.7	Austin, Tex.....	85	95	68	0.04	Fort Yates, Dak.....	69	96	45	2.45	Fort Meade, Dak.....	82	95	37	2.59
Wellborough, Va.....	67	93	3.0	Grand Coteau, La.....	81	96	67	1.75	Fort Buford, Dak.....	70	102	39	0.25	Fort Assiniboine, Mont.....	82	95	37	2.59
Fallsington, Pa.....	73	93	5.6	Liberty Hill, La.....	75	103	52	1.05	Fort Totten, Dak.....	65	94	44	5.94	Fort Lyon, Colo.....	73	104	42	1.70
Quakertown, Pa.....	68	88	4.5	Mount Ida, Ark.....	75	103	52	1.05	Upper Mississippi Valley.				Platteau Districts.					
Drifton, Pa.....	66	91	4.0	Lead Hill, Ark.....	70	100	52	4.78	Nellisville, Wis.....	59	89	37	6.32	Carson City, Nev.....	68	95	39	0.62
Troy, Pa.....	66	92	3.3	Fayetteville, Ark.....	71	88	50	3.77	Lancaster, Wis.....	59	89	40	5.65	Grand Junction, Colo.....	72	104	52	1.62
Easton (Lafayette Col.), Pa.....	66	92	3.3	Point Pleasant, La.....	80	97	66	0.87	Madison, Wis.....	67	85	49	4.39	Puerto de Luna, N. Mex.....	74	99	63	5.63
Dyberry, Pa.....	66	90	3.4	Rio Grande Valley.				Prairie du Chien, Wis.....	67	90	50	5.91	Nephi, Utah.....	74	92	40	0.35	
Catawissa, Pa.....	69	93	4.5	Fort Brown, Tex.....	84	97	71	0.32	Northfield, Minn.....	68	87	39	3.48	Fort McDermitt, Nev.....	71	95	47	.....
Westchester, Pa.....	70	91	4.9	Ohio Valley and Tennessee.				Minneapolis, Minn.....	67	90	51	3.91	Fort Bridger, Wyo.....	63	84	31	2.90	
Easton, Pa.....	78	.....	.....	Wellsburg, W. Va.....	66	90	48	1.55	Chester, Minn.....	68	88	50	7.79	Fort Wingate, N. Mex.....	67	87	43	4.64
Germantown, Pa.....	76	96	5.8	Helvetia, W. Va.....	66	90	48	4.30	Monticello, Iowa.....	68	90	45	3.78	Pacific Slope.				
Tamaqua, Pa.....	76	96	5.8	Marion, Va.....	70	88	56	3.37	Des Moines (near) Iowa.....	68	90	45	.....	Poway, Cal.....	73	104	59	trace
Chambersburg, Pa.....	70	95	5.2	Milan, Tenn.....	74	99	54	1.58	Independence, Iowa.....	68	84	59	4.75	Caluenga Valley, Cal.....	77	104	56	trace
Hulmeville, Pa.....	74	95	4.5	Austin, Tenn.....	79	95	59	2.39	Ottumwa, Iowa.....	69	92	57	4.92	Princeton, Cal.....	77	104	56	trace
Haverford College, Pa.....	74	95	4.5	Estill, Tenn.....	72	93	54	1.93	Manchester, Iowa.....	68	90	49	2.42	Salinas, Cal.....	59	70	53	0.18
State College, Pa.....	70	90	4.4	Gramplan Hills, Pa.....	68	94	50	4.07	Indianola, Iowa.....	70	88	53	2.81	Oakland, Cal.....	61	78	54	0.25
Mountainville, N. Y.....	69	95	4.2	Leedsdale, Pa.....	67	92	46	2.07	Cresco, Iowa.....	70	88	53	2.81	Hydesville, Cal.....	60	80	50	0.02
Auburn, N. Y.....	68	87	4.6	Jacksonburg, Ohio.....	74	99	44	1.20	Fort Madison, Iowa.....	65	85	51	6.84	College City, Cal.....	78	105	53	.....
Menand, N. Y.....	71	94	5.0	New Athens, Ohio.....	68	91	49	1.39	Marquette, Iowa.....	63	87	45	5.77	Sacramento, Cal.....	78	105	53	0.01
Leroy, N. Y.....	71	94	5.0	Westerville, Ohio.....	68	92	43	1.06	Humboldt, Iowa.....	66	88	48	4.27	San Rafael, Cal.....	90	39	0.09	
Couperstown, N. Y.....	66	87	4.3	College Hill, Ohio.....	70	92	51	3.31	Peoria, Ill.....	74	97	50	4.13	Eola, Oreg.....	67	92	50	0.17
Port Jervis, N. Y.....	70	90	5.1	Portsmouth, Ohio.....	72	93	51	1.35	Collinsville, Ill.....	72	94	48	1.82	Albany, Oreg.....	68	96	52	0.43
Phillipsburg, N. J.....	74	92	4.9	Frankfort, Ky.....	70	90	49	1.60	Pleasant Grove, Wash. T.....	70	96	45	2.56	East Portland, Oreg.....	94	50	0.03	
Somerville, N. J.....	72	94	5.3	Richmond, Ind.....	71	91	56	1.74	Bainbridge Isl'd, Wash. T.....	65	92	50	2.05	Pleasant Grove, Wash. T.....	95	37	trace	
Caldwell, N. J.....	73	91	5.6	Lafayette, Ind.....	70	89	54	1.12	Annah, Ill.....	73	92	50	2.05	Presidio of S. F., Cal.....	64	75	48	.....
Readington, N. J.....	76	100	5.6	Clinton, Ind.....	70	90	45	0.75	Rockford, Ill.....	67	87	51	3.68	Fort Mason, Cal.....	60	74	50	.....
Vineyard, N. J.....	73	91	5.6	Jeffersonville, Ind.....	73	94	50	2.02	Fort Snelling, Minn.....	68	101	45	3.61	Fort Spokane, Wash. T.....	73	103	44	0.20
Moorestown, N. J.....	71	93	4.8	Spiceland, Ind.....	70	92	46	0.40	Missouri Valley.				Fort Townsend, Wash. T.....	63	86	43	2.02	
Belvidere, N. J.....	70	90	5.0	Mattoon, Ill.....	73	93	55	2.20	De Soto, Nebr.....	69	91							

Yates Centre, Kansas, 8th.
Salina, Kansas, 28th.
Wytheville, Virginia, 6th.

SAND STORMS.

Fort Yates, Dakota, 29th.
Fort Assinaboine, Montana, 21st.
Wickenburg, Arizona, 30th.
Fort McDowell, Arizona, 1st, 5th, 12th, 18th, 24th, 25th, 31st.
Lewiston, Idaho, 30th.
Dayton, Washington Territory, 5th, 23d, 30th.

MIGRATION OF BIRDS.

Geese flying northward: Pensacola, Florida, 23d.
Brants flying southward: Fort Smith, Arkansas, 8th.

NOTES AND EXTRACTS.

REPORT OF THE ALABAMA WEATHER SERVICE, UNDER DIRECTION OF PROFESSOR
P. H. MELL, JR.

MECHANICAL AND AGRICULTURAL COLLEGE,
AUBURN, ALABAMA, September 1, 1884.

August opened with five days of showers, accompanied by thunder and lightning and westerly winds. Clear weather began on the 6th, with a decided fall of temperature; and the month continued cool and dry, with winds from the east and north until the 20th, when the wind changed to the west, and the temperature began to rise rapidly, and a few local showers were reported. The week of the 22-29th was the warmest period of the summer. The rains and winds of the 29th and 30th cooled the atmosphere, and the 31st was clear, with cool breezes from the north and west. With the exception of the one hot week the month was pleasant and uniform in temperature, and the average was lower than that of July. The precipitation was also below the average.

Observers are requested to be very careful in measuring the amount of precipitation. The great discrepancy between reports from the same section of the state leads the Director to suppose that more or less error exists in the manner of measuring, or in the rain-gauges themselves.

State summary.

Mean temperature, 75°.6; highest temperature, 102°, at Troy, on the 1st; lowest temperature, 52°, at Calera, on the 6th; monthly range of temperature for the state, 50°; greatest monthly ranges at stations, 40° at Jacksonville and Fayette, and 48° at Calera; least monthly ranges of temperature, 15° at Wetumpka, and 30° at Evergreen; greatest daily ranges, 30° at Troy, on the 3d; 40° at Birmingham, on the 28th; least daily ranges of temperature, 0° at Eden, on the 7th, and 6° at Mobile, on the 9th.

Mean depth of rainfall for the state, 2.41 inches; mean daily rainfall for the state, 0.08 inch; largest monthly rainfall, 7.85 inches at Clanton; least monthly rainfall, 0.20 at Greensborough; largest daily rainfall, 2.50 at Clanton, on the 4th.

The days of general rainfall were the 1st, 2d, 3d, 4th, 29th, 30th; average number of days on which rain fell, 6; average number of cloudy days, 6; fair days, 15; clear days, 10; warmest day, 29th; coolest day, 6th.

Prevailing directions of the wind, west and northwest; greatest force of wind was reported from Montgomery, on the 4th—27 miles per hour from the northeast.

The following extract is taken from the August report of the "Nebraska Weather Service," under direction of Professor G. D. Sweezy, of Doane College, Crete, Nebraska:

BOSWELL OBSERVATORY, DOANE COLLEGE,
Crete, Nebraska, August, 1884.

With the issue of the monthly bulletin for July, Prof. S. R. Thompson, who has for many years conducted so ably and faithfully the Volunteer Weather Service for Nebraska, retired from its superintendency with the request that the director of Boswell University should succeed him. It has been with something of hesitation that we have undertaken it, mainly because of the pressure of other duties in connection with the college and the observatory. Realizing however the importance of maintaining and if possible, of extending this service, and that not only the director but all the observers connected with the work freely give their services without remuneration, it has seemed hardly generous to decline, especially as the college with its astronomical and meteorological observatory and library seemed better situated on some accounts than any other station in the state to undertake this work.

General Hazen, Chief Signal Officer, U. S. Army, has kindly extended the offer of his valuable assistance, not only in maintaining but in extending the Nebraska Weather Service. In this it is hoped that many who are interested in the weather problems and meteorological history of the state will co-operate. It is especially desired that persons in various parts of the state, especially the newer western and northern portions will volunteer to act as observers in their own localities. Observations with thermometer and rain-gauge, if nothing more, are desirable.

Weather for August.—Average rainfall: southeast section, 4.02 inches; northeast section, 6.34 inches; southwest section, 3.06 inches; northwest section, 2.85 inches; state, 4.06 inches.

Mean relative humidity: Crete, 82.

Mean temperature: for the state, 71°.3. Average of noon observations, 75°.93.

The following are some of the maximum and minimum temperatures:

Stockham, 92°, 68°; De Soto, 91°, 46°; Crete, 93°, 47°.7.

Wind: Number of miles traveled, Crete, 7,219 miles. Average velocity, Crete, 9.7 miles per hour. Highest velocity, Crete, 36 miles, south.

Miscellaneous.—Fogs: Syracuse, 22d and 28th; Weeping Water, 15th and 28th; De Soto, 14th, 24th, and 28th; Crete, 22d, 25th, and 28th; Beaver Creek, 13th, 17th, and 28th; Red Willow, 10th, 11th, 12th, 13th, and 14th.

Thunderstorms: Central City, 15th and 17th; Keene, 16th and 18th; Beaver Creek, 19th, 25th, and 26th; West Point, 15th and 18th; Red Willow, 15th, 17th, and 19th; Marquette, 13th and 26th; Fairbury, 17th; Superior, 12th, 13th, 15th, 17th, 18th, 19th, and 21st.

REPORT OF THE TENNESSEE WEATHER SERVICE, UNDER DIRECTION OF HON. A. J. MCWHIRTER.

The month of August was characterized by but few abnormal features, among which were the cool nights during the early part of the month, the high temperature, during the latter part, the severe electric storms of the 3d and 29th, and the deficiency in the rainfall.

The mean temperature was 73°.6, or 2°.4 below that for the previous month, and 1°.6 above that for the corresponding month of last year. The highest temperature was 99°, or 1° above that for August of last year; the lowest temperature was 48°, or 2° above the July minimum and 5° above that for August, 1883. The mean of the maximum temperatures was 4° above and the mean of the minimum temperatures was 1°.7 above those for August, 1883. The highest temperatures were general during the latter portion, and the low temperatures during the early portion of the month.

The average rainfall for the state was 2.08 inches, or 1.35 inches less than for the corresponding month of 1883, and 3.42 inches less than the average for July, 1884. The days of greatest rainfall were the 3d, 21st, 22d, and 29th. The greatest daily rainfall was 3.10 inches on the 29th, at Xenophon, Hancock county. The rainfall was very irregularly distributed, being general only on the above-named days. Many of the rains were very local. The rain of the 3d was the heaviest in the middle division, and that of the 29th was heaviest in the eastern and western divisions. It is a little remarkable that with so small a rainfall only three days in the month were reported entirely free from rain throughout the state.

The severe drought which set in during the early part of the month has had a very damaging effect on the crops of corn, cotton, and tobacco.

REPORT OF THE MISSOURI WEATHER SERVICE; AUGUST, 1884.

The mean temperature at Saint Louis during the month was 74°.4, or 2°.1 below the normal. There were only four places—Carthage, Harrisonville, and Cairo, in the southern part of the state, and Mascoutah in Illinois—where the mean temperature was above that at Saint Louis. The daily means during the month were with but little range, the highest being on the last days of the second decade of the month and the lowest on the 9th. Throughout the state the means were below the normals.

The higher maximums were observed in the latter part of the second decade, and the lower minimums in the latter part of the first decade of the month.

The mean daily range at the central station was 17°.2, being as small as 6°.6 on the 3d, and as large as 25°.5 on the 13th.

There was no rainfall at Saint Louis until the 20th of the month. It was so generally throughout the state also. The amount at the central station was 2.66 inches below the normal for Saint Louis. The distribution over the state was small in the southern part—0.50 at Greenfield, with a large amount toward the northern part, the largest being 6.52 inches at Miami.

The crops, where heard from, were revived by the late rains and are doing well, not having suffered so much as might have been expected from the lack of rain in the first part of the month on account of the comparatively low temperature.

A. RAMEL, Assistant in charge.
Washington University, September 9, 1884.

REPORT OF THE LOUISIANA WEATHER SERVICE, UNDER DIRECTION OF MR. ROBERT S. DAY.

The early part of the month was comparatively cool, but the last week was very warm. Drought is generally reported in the lowlands. On the hills east of the Mississippi river, where the spring and early summer were dry, good rains have fallen.

The temperature for the month was above the average, but it was not as high as for August, 1883. In New Orleans less rain fell than at any time since the record has been kept. Crops generally have suffered for rain. Cotton is reported shedding. Sugar and rice are spotted, as they have had showers or drought.

State summary.

Mean temperature, 81°.3; highest temperature, 103°.5 at Shreveport and Franklin, on the 29th; lowest temperature, 45° at Lake Providence, on the 4th; greatest daily range of temperature, 45° at Lake Providence, on the 2d; least daily range of temperature, 2°.5 at Vidalia, on the 6th.

Average rainfall, 1.70 inches; greatest daily rainfall, 2.65 inches at Clin-

ton, on the 24th; greatest monthly rainfall, 6.23 inches at Clinton; average number of rainy days, 4.

The following is a summary of the observations made by the observers of the Volunteer Weather Service of Indiana:

Station.	County.	Temperature.			Precipitation.	
		Highest.	Lowest.	Mean.	Total monthly.	Largest daily.
		°	°	°		Amount. Date.
Marengo.....	Crawford.....	96	55	71.7	3.90	2.80 3
Blue Lick.....	Clark.....	91	53	72.8	3.90	1.30 22
Princeton.....	Gibson.....	92	48	72.1	1.90	0.90 7
Salem.....	Washington.....	96	55	72.1	1.10	0.55 3
Connersville.....	Fayette.....	93	55	72.1	0.68	0.48 22
Noblesville.....	Hamilton.....	88	52	70.2	0.48	0.35 28
Worthington.....	Greene.....	86	53	70.7	1.12	0.64 3
Greenfield.....	Hancock.....	91	59	70.4		
Spiceland.....	Henry.....	91	55	71.0	0.36	0.13 29
Martinsville.....	Morgan.....	91	54	68.9	0.45	0.42 21
Maumy.....	Rush.....	90	53	69.5	0.57	0.38 22
Richmond.....	Wayne.....	92	52	71.8	0.50	0.26 29
Fort Wayne.....	Allan.....	90	46	67.6	0.70	0.70 28
Logansport.....	Cass.....	90	57	71.5	1.83	0.99 28
Sums.....		12,670	744	992.4	15.69	9.70
Averages for state.....		90.5	53.1	70.9	1.21	0.75

REPORT OF THE OHIO METEOROLOGICAL BUREAU, AUGUST, 1884, UNDER DIRECTION OF PROF. T. C. MENDENHALL.

The mean atmospheric pressure for August, 30.025 inches, is .041 below the mean for the corresponding month of last year. The maximum, 30.379 inches, is .059 higher than the maximum of August, 1883, and the minimum, 29.427, inches, is .351 below that of the minimum of August, 1883. The maximum and the minimum occurred at nearly all stations on the 9th and 29th, respectively.

The mean temperature, 70°.8, is 2°.6 above that of August, 1883, and 1°.24 below the normal for August. The maximum temperature was 98°.0, being exactly the same as that of last year. The minimum temperature, 38°.0, on the 27th, at Junction, is 8°.5 below the minimum of August, 1883. Very low temperatures for the month were reported on the 5th, 8th, and 9th, several stations reporting frost on these dates, but not enough to injure anything.

The most remarkable feature of the reports for the month is the small rainfall reported from nearly all stations. The mean rainfall, 1.45 inches, is .43 below that of the same month of last year, and 2.31 inches below the normal for August. The greatest rainfall, which was 3.24 inches, at Wil-

mington, is .52 below the normal, while the least rainfall, .45, at Ohio State University, is 3.31 below the normal. The northern and southern portions of the state had more rain than the central part.

The average number of clear days, 17.7, is 4.7 above that of August, last year, while the number of days on which rain fell is nearly the same.

The prevailing direction of the wind was from the southwest.

State summary.

Mean barometer, 30.035 inches.

Highest barometer, 30.379 inches on the 9th, at Oberlin.

Lowest barometer, 29.427 inches on the 30th, at Jefferson.

Range of barometer, .952 inch.

Mean relative humidity, 71.0 per cent.

Mean temperature, 70°.8.

Highest temperature, 98°.0, on the 20th, at Logan.

Lowest temperature, 38°.0, on the 27th, at Junction.

Range of temperature, 60°.0.

Mean daily range of temperature, 23°.7.

Greatest daily range of temperature, 44°.0, on the 26th at Ohio State University.

Least daily range of temperature, 6°.8, on the 25th, at Toledo.

Average number of clear days, 17.7.

Average number of fair days, 9.9.

Average number of cloudy days, 3.4.

Number of days on which rain fell, 6.3.

Mean rainfall, 1.45 inches.

Average daily rainfall, .047 inch.

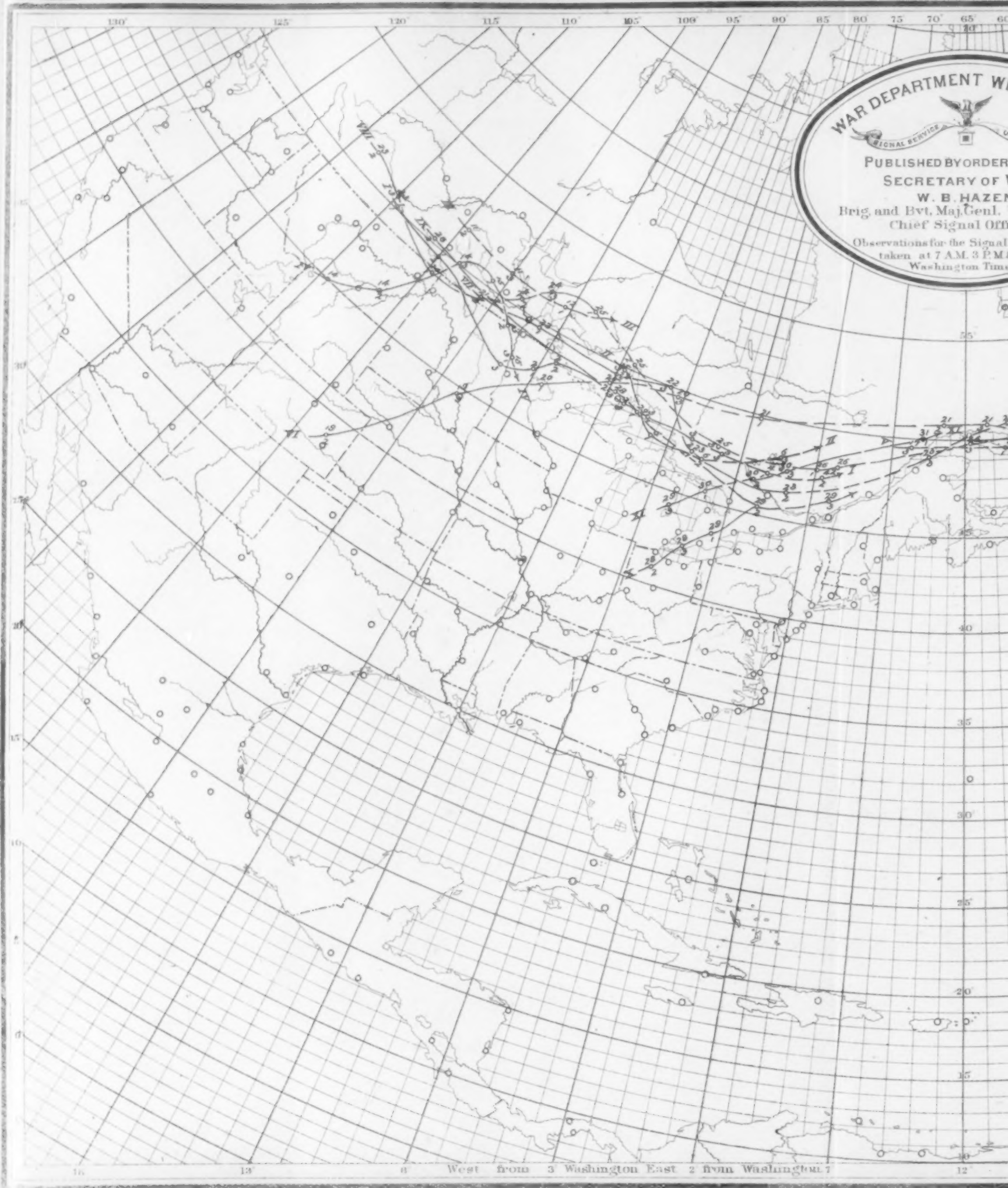
Greatest rainfall, 3.24 inches, at Wilmington.

Least rainfall, .45 inches, at Ohio State University.

Prevailing direction of wind, southwest.

The following meteorological summary is taken from the Georgia crop report, prepared under the direction of Hon. J. T. Henderson, Commissioner of Agriculture.

Districts.	Temperature.			Precipitation.
	Maximum.	Minimum.	Mean.	
Northern counties.....	94.0	55.5	75.6	1.25
Middle counties.....	92.9	53.1	77.7	2.80
Southwest counties.....	94.0	60.5	80.0	1.94
East counties.....	96.5	59.0	78.2	4.29
Southeast counties.....	90.5	66.2	80.5	5.69
Averages for state.....	93.6	60.1	78.5	3.32



Barometer Areas, August, 1884.

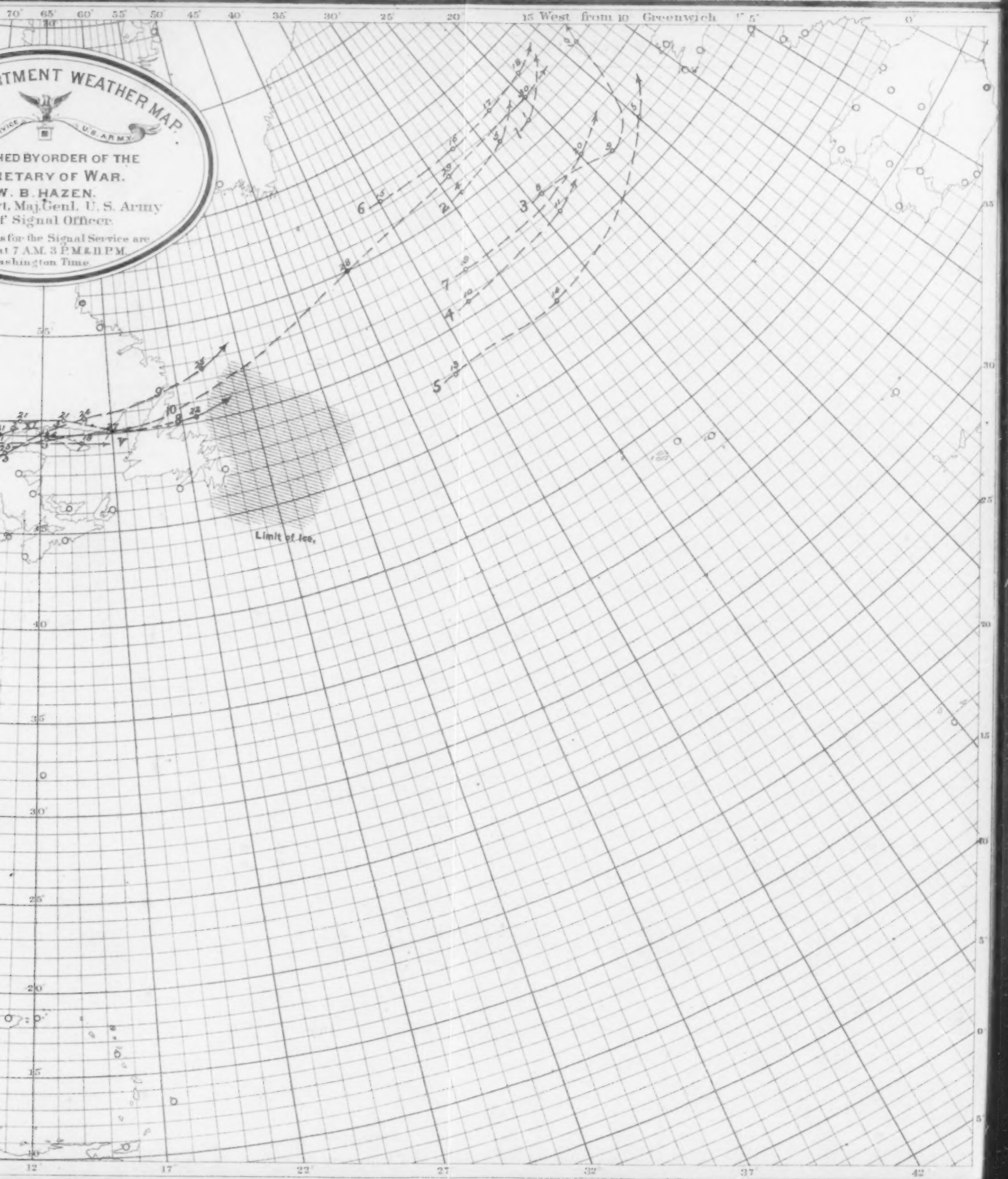


Chart II. Isobars, Isotherms, and Winds. August, 1884.

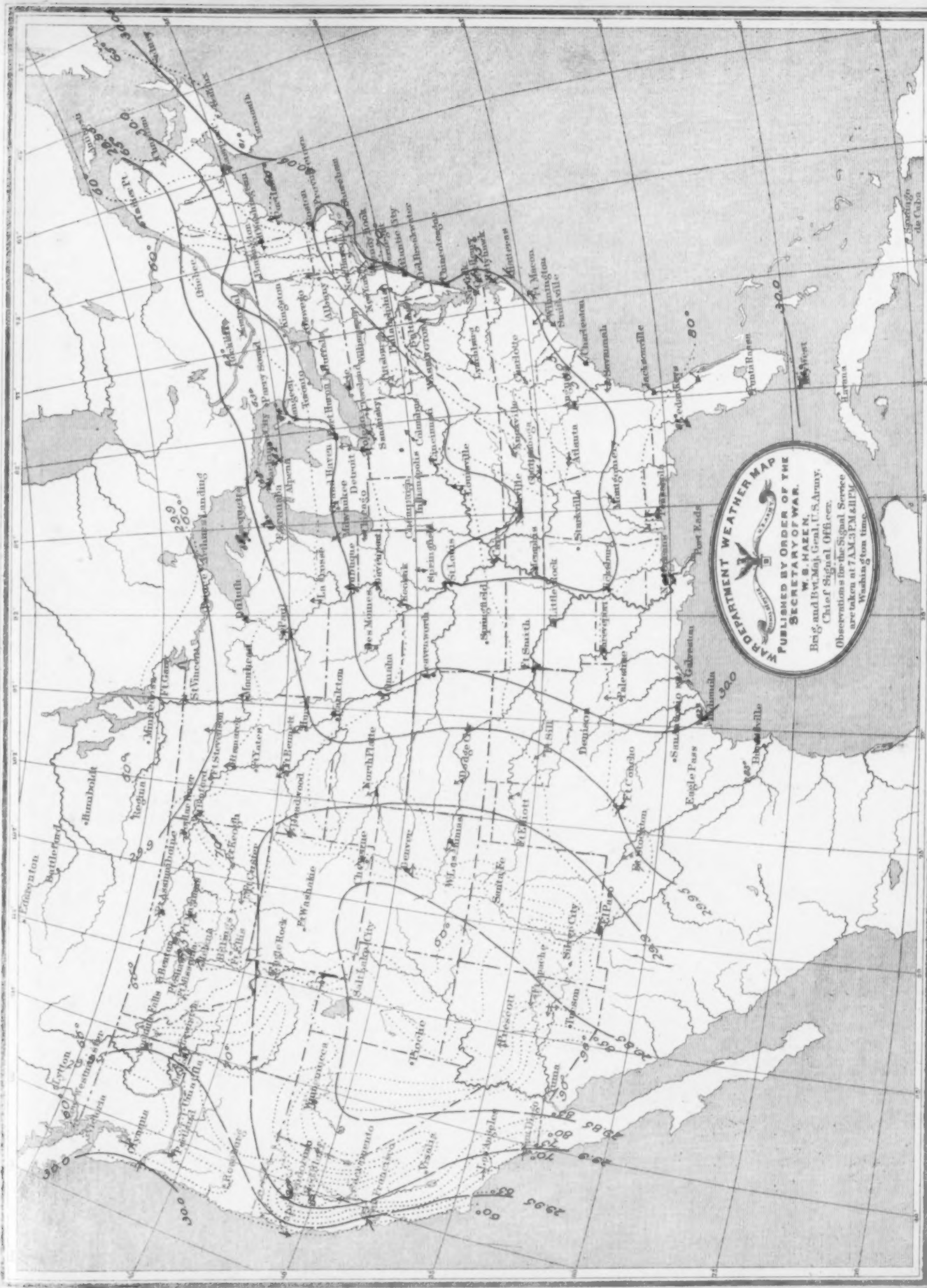


Chart III. Precipitation, August, 1884.

Form 106 F

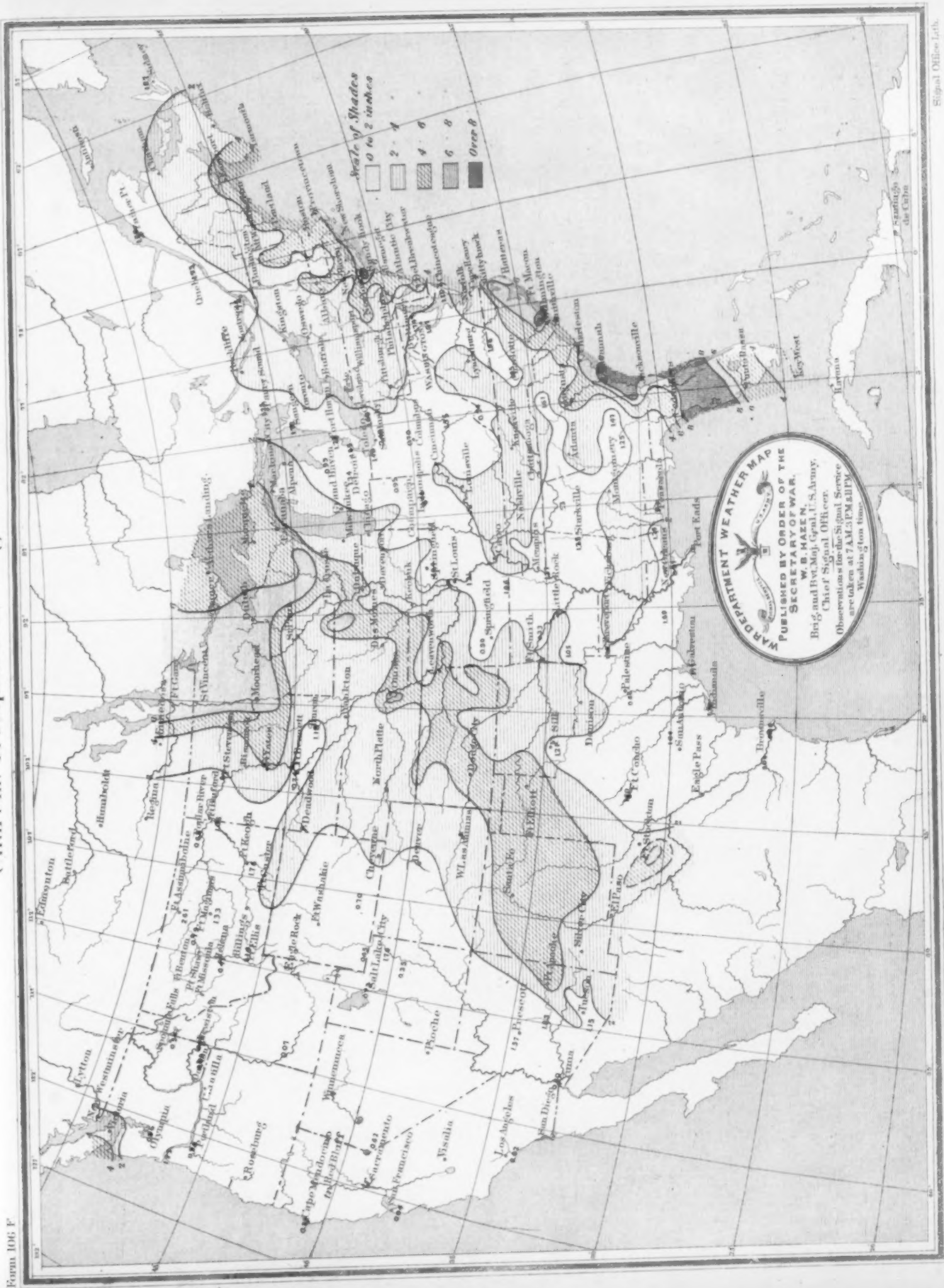
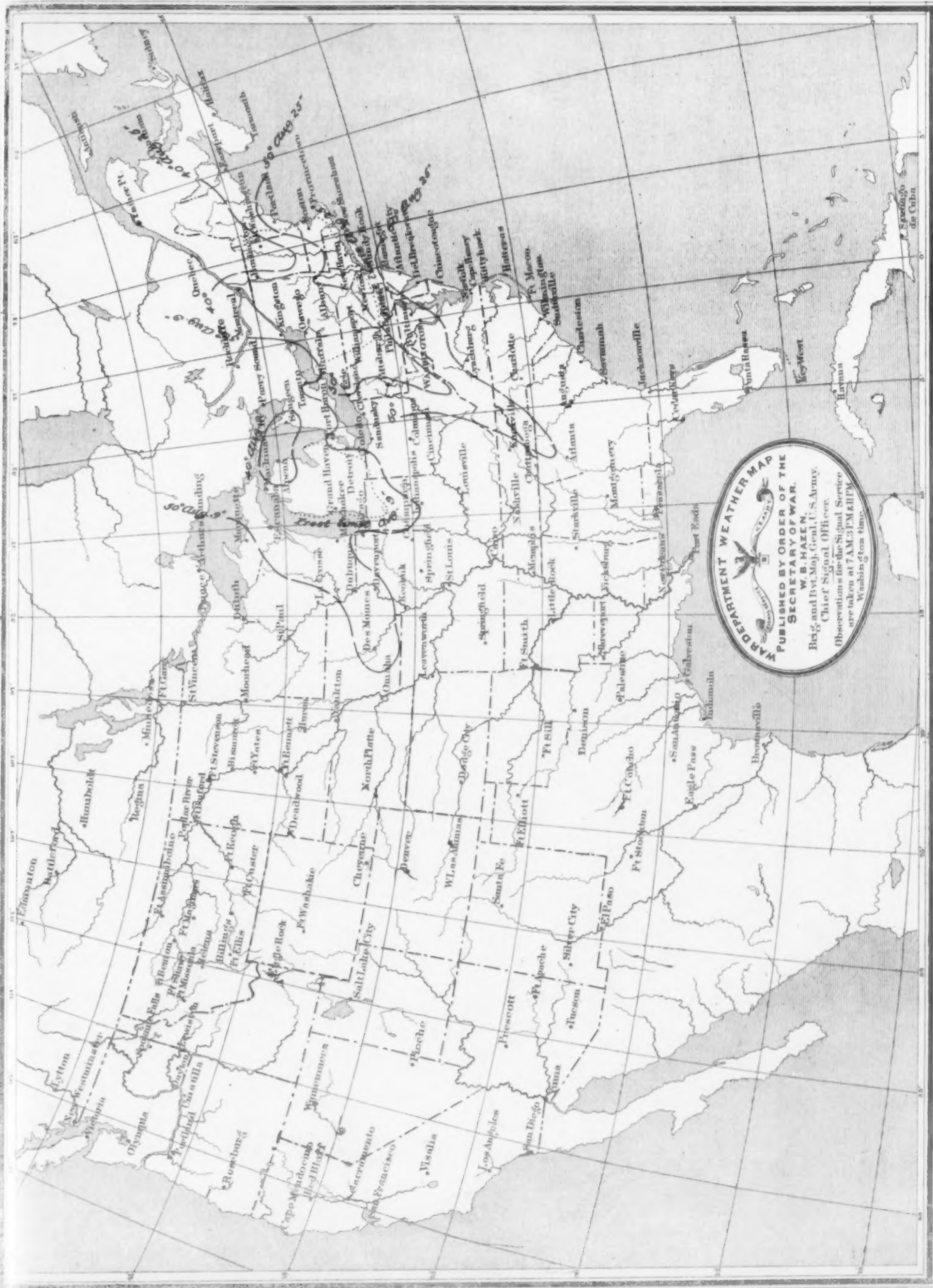


Chart IV. Limits of Frosts, and Minimum Isotherms for August 9 and 25, 1884.



102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Chart V. Departures from Normal Atmospheric Pressure and Temperature. August, 1884.

Form 1431 F.

